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ABSTRACT

The decade of the 1980s saw great change in the educational system. This report examines the changing demographics of high school students over the last decade and investigates the impact that these changes may have had on high school dropout rates. Specifically, the study examined the changing nature of the high school population during the last decade and describes the different effects of various student-level characteristics on the propensity for students to drop out of school between 1980 and 1982 compared to 1990 and 1992. The report provides data that depict changes in the characteristics of students' families, in students' economic backgrounds, in dropout rates, and in the characteristics of dropouts. Data show that during the 1980s, a growing number of students with characteristics traditionally associated with school failure began attending high school; at the same time, high school dropout rates decreased by almost 50 percent. The declines occurred among students with a variety of characteristics--minority and majority students, students in intact families and nonintact families, and students with children of their own living in their household. Many groups of students traditionally considered "at risk" for school failure dropped out at lower rates in 1990 than in 1980. However, there were other groups of students whose dropout rates did not improve. These were students from poor families, who had histories of poor academic achievement, and who had multiple risk factors in their backgrounds. The study used data on two cohorts of high school sophomores collected by the National Center for Education Statistics--the sophomore cohort of 1980 from the High School and Beyond (HS&B) study, and the sophomore cohort of 1990 from the National Education Longitudinal Study of 1988 (NELS:88). Appendices contain methodological notes, standard error tables, and multivariate analyses. Eight figures and 57 tables are included. (LMI)

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NATIONAL CENTER FOR EDUCATION STATISTICS

Technical Report **October 1996**

A Comparison of High School Dropout Rates in 1982 and 1992

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Technical Report October 1996

A Comparison of High School Dropout Rates in 1982 and 1992

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U.S. Department of Education
Office of Educational Research and Improvement NCES 96-893

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FOREWORD

The High School and Beyond Study (HS&B) and the National Education Longitudinal Study of 1988 (NELS:88) are two large scale, national longitudinal studies designed and sponsored by the National Center for Education Statistics (NCES), with support from other government agencies. HS&B began with a cohort of high school sophomores and a cohort of high school seniors in 1980. The sophomore cohort was resurveyed in 1982, 1984, 1986, and 1992. NELS:88 began in 1988 with a cohort of eighth graders; these eigth graders were resurveyed in 1990, 1992, and 1994.

NELS:88 was designed to facilitate longitudinal comparisons with HS&B. Use of appropriate cohort membership flags permits the analyst to compare the characteristics and dropout rates of the sophomore cohort of 1980 and the sophomore cohort of 1990. Thus, HS&B and NELS:88 enable researchers to examine the characteristics of two nationally representative cohorts of students exactly 10 years apart. This study describes the changing characteristics of high school sophomores between 1980 and 1990 and examines changes in dropout rates between 1980–82 and 1990–92. The study shows that while overall dropout rates have declined since the early 1980s, they have done so primarily for students who would not be thought of as at high risk of dropping out. While dropout rates did decline for students with a wide variety of characteristics (including most minority groups), dropout rates remained constant for poor students and those who were less academically prepared.

I hope that the information in this report will be useful in ongoing discussions about this critical national issue.

Pascal D. Forgione, Jr.
Commissioner of Education Statistics

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Without the assistance of Barbara Kridl, Don Eike, Mary Sukkestad, Leslie Retallick, Andrea Livingston, and Karyn Madden of MPR Associates this report could not have been prepared. They provided invaluable analytical, editorial, graphic, and production assistance.

The report was reviewed by Mary Frase, Lee Hoffman, Robert Burton, and Sam Peng of NCES. Their efforts and contributions are greatly appreciated.

EXECUTIVE SUMMARY

This report examines the changing demographics of high school students over the last decade and investigates the impact these changes may have had on high school dropout rates. We show that while during the 1980s a growing number of students with characteristics traditionally associated with school failure began attending high school, at the same time, high school dropout rates decreased by almost 50 percent. These declines occurred among students with a variety of characteristics—for minority and majority students, for students in intact families and non-intact families, and for students with children of their own living in their household. Many groups of students traditionally considered "at-risk" for school failure dropped out at lower rates in 1990 than in 1980. However, there were other groups of students whose dropout rates did not improve. These were students from poor families, who had histories of poor academic achievement, and who had multiple risk factors in their backgrounds. These students seem to have been left untouched by the factors that have led to lower overall dropout rates during the last 10 years.

A few highlights from the report are summarized below:

Changes in the characteristics of students' families

- During the past decade there was a 5 percentage point increase in the proportion of sophomores living in families below the poverty line—from about 13 percent in 1980 to about 18 percent in 1990.
- Furthermore, the sophomore cohort of 1990 was made up of greater proportions of minority students than was the sophomore class of 1980. In particular, the proportion of the class of 1990 who were from Asian or Hispanic backgrounds grew—thereby, increasing the language and cultural diversity of the sophomore class.
- There was a 6 percentage point decrease in the proportion of students from intact families between 1980 and 1990. About 70 percent of 1980 sophomores were living in intact families, compared with 64 percent of 1990 sophomores.
- One of the most significant changes in the lives of young people over the last decade was the increase in the proportion of young people having children of their own. Less than 1 percent of sophomores in 1980 had a child of their own living in their home. In 1990, 2 and a half percent had children living in the home.

Changes in the characteristics of students' academic background

- Despite the fact that the 10th-grade class of 1990 had a larger proportion of students with characteristics traditionally associated with at-risk status, the 1990 class was somewhat more academically prepared in the 10th grade than were their peers in 1980.

For example, they had earned more credits by the 10th grade; fewer had low grades; and they did more homework and watched less television.

Changes in dropout rates

- Dropout rates declined by over 5 full percentage points over the decade. About 11 percent of the 1980 10th-grade class had dropped out, compared with only 6 percent of the 1990 class.
- On the one hand decreases in dropout rates were widespread, with a number of different groups of students sharing in the decline. Dropout rates decreased for minority and majority students, for students in intact families and non-intact families, and for students with children of their own living in their household.
- At the same time, students in poverty and with relatively poor academic achievement seem to have been left untouched by the combination of factors that have led to lower dropout rates during the last 10 years. Sophomores with these characteristics in 1990 dropped out at rates comparable for similar students in 1980.

Changes in the characteristics of dropouts

- Reflecting the general decrease in dropouts rates for non-poor 10th graders over the decade, about 24 percent of the dropouts in the 1980 cohort were from poor families, while over 41 percent of dropouts in the 1990 cohort were from poor families.
- Dropouts in 1990–92 were more likely than dropouts from 1980–82 to be from Asian or Hispanic backgrounds, and less likely to be from white backgrounds.
- A greater proportion of dropouts in 1990–92 had a child of their own living with them when they were in the 10th grade.
- Greater proportions of dropouts in 1990–92 exhibited at least one family risk factor or academic risk factor.
- Dropouts in 1990–92 had earned more high school credits than had dropouts in the previous decade.

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INTRODUCTION

The decade between 1980 and 1990 witnessed several changes in the school-age population in this country—changes that did not bode well for the success of the American educational system. During the 1980s increasing proportions of teenagers with characteristics that traditionally predict school failure—those from poor families, those from single-parent families, and those who already had children of their own—began attending American high schools. For example, the proportion of school-aged children living in households whose income fell below the poverty line increased from 18 percent in 1980 to 20 percent in 1990. Throughout this decade the proportion of children under 18 years old living with both biological parents decreased from 77 percent in 1980 to 73 percent in 1990. The decade also experienced an increase in teenage pregnancies and child bearing. For example, in 1980 the birth rate for mothers age 15 to 19 years old was 53 in 1,000, compared with a rate of 62 in 1,000 in 1990. Furthermore, in 1980 less than half (48 percent) of births to women under 20 were to unmarried mothers, compared with more than two-thirds (68 percent) of births to women under 20 in 1990.[1]

At the same time that these demographic changes were occurring, American high schools were responding to a series of critical reports on American education by raising graduation requirements and increasing time in the classroom.[2] For example, between 1984 and 1990, 42 states had increased the number of courses required for high school graduation. In most cases, states increased graduation requirements in basic academic areas such as mathematics, science, and English.[3] At the time, many policymakers and educational researchers felt that while many students would benefit from raising academic requirements in high school, some students would suffer under these new, more challenging educational standards. They argued that, in particular, at-risk students would be severely affected by the new standards if steps were not taken to provide these students with additional learning resources.[4]

Of particular concern to some policy makers was the impact that the new standards might have on dropout rates. Dropout rates have traditionally been a leading barometer of the success of the educational system (one indication of this is the prominence of the high school completion rate among the National Educational Goals). Some feared that the main result of the new standards would be higher dropout rates for students already on the academic margins of school. For example, Graham Down remarked during the early

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[1]U.S. Department of Health and Human Services, *Vital Statistics of the United States, 1980, Vol. 1, Natality* (Washington, D.C.: 1981); and *Vital Statistics of the United States, 1990, Vol. 1, Natality* (Washington, D.C.: 1991).

[2]National Commission on Excellence in Education, *A Nation at Risk: The Imperatives for Educational Reform* (Washington, D.C.: 1983).

[3]E. Medrich et al., *Overview and Inventory of State Requirements for School Coursework and Attendance* (Washington, D.C.: National Center for Education Statistics, 1992).

[4]S. Hamilton, "Raising Standards and Reducing Dropout Rates," in G. Natriello, *School Dropouts: Patterns and Policies* (New York: Teachers College Press, 1986).

1980's that "if virtually all students are mandated into courses in math and science that are designed for well-prepared students, we are likely to produce a soaring failure rate and an increase in school dropouts."[5] In a similar vein, some argued that "raising standards in secondary schools without making other organizational and instructional changes would increase the dropout rate because those students who now drop out would continue to do so and some additional proportion of marginal students or potential dropouts would move into the dropout category rather than increase their effort sufficiently to graduate from high school."[6]

Clearly, the challenge for schools over the decade was to raise standards while assuring that all students had the opportunity to meet them. During the 1980s, many prominent models of reform were designed to do just that. Examples of these kinds of reforms were Robert Slavin and his colleagues' Success For All model, the California Academies, and a variety of other "systemic" approaches to school reform for at-risk youth.[7] These programs sought to combine "relevance and rigor" in an attempt to increase at-risk students' achievement and completion rates.

Thus the decade of the 1980s was one of great change in the educational system—changes in who came to school and what happened to them once they got there. Given all of these changes over the decade, what impact did they have on dropout rates? At the beginning of the decade, one would have predicted that the changes in demographic characteristics would increase dropout rates. Expansion of state standards for graduation may also have called for a similar prediction. However, one would have to believe that the efforts that were made over the decade to change school policies and practices had the potential to mitigate some of these consequences. Indeed, at the end of the decade one can now see that state standards for high school graduation did increase in the 1980s, that students responded to those standards by taking more academic coursework, and that dropout rates, rather than increasing as some had feared, in fact decreased. Data from the Current Population Survey (CPS) show that the proportion of persons 16–24 years old who were dropouts declined from 14.1 percent in 1980 to 12.1 percent in 1990.[8] Decreases in dropout rates were greatest among some of the groups most likely to have dropped out in the past. For example, the dropout rate among blacks aged 16–24 declined from 19.2 percent in 1980 to 13.7 percent in 1990. Why did this decline occur?

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[5]G. Down, "Assassins of Excellence," in *The Great School Debate*, ed. B. Gross (New York: Simon and Shuster, 1985).

[6]S. Hamilton, "Raising Standards and Reducing Dropout Rates," in G. Natriello, *School Dropouts: Patterns and Policies* (New York: Teachers College Press, 1986).

[7]R. Slavin, N. Karweit, and N. Madden, *Effective Schools for Students At-Risk* (Boston: Allyn and Bacon, 1989); D. Stern, M. Raby, and C. Dayton, *Career Academies: Partnerships for Reconstructing American High Schools* (San Francisco: Jossey-Bass, 1992); G. Wehlage, R. Rutter, G. Smith, N. Lesko, and R. Fernandez, *Reducing the Risk: Schools As Communities of Support* (London: The Falmer Press, 1989).

[8]This is the "status" dropout rate. For a discussion of various methods of calculating dropout rates, see M. McMillen, and P. Kaufman, *Dropout Rates in the United States: 1994* (Washington, D.C.: National Center for Education Statistics, July 1996).

This report explores this question in more detail. It examines the changing nature of the high school population during the last decade and describes the different effects of various student-level characteristics on the propensity for students to drop out of school between 1980 and 1982 compared to 1990 and 1992. It uses data on two cohorts of high school sophomores collected by the National Center for Education Statistics—the sophomore cohort of 1980 from the High School and Beyond (HS&B) study, and the sophomore cohort of 1990 from the National Education Longitudinal Study of 1988 (NELS:88). Thus, HS&B and NELS:88 enable researchers to examine the characteristics of two nationally representative cohorts of students exactly 10 years apart.

As will be seen later, we have determined that while overall dropout rates have declined, they have done so primarily for students whom would not be thought of as at high risk of dropping out. While dropout rates did decline for students with a wide variety of characteristics (including most minority groups), dropout rates remained constant for poor students and those who were less academically prepared. Thus whatever reforms may have helped reduce dropout rates overall, they have not reached the students who are conceivably in greatest need. Moreover, the proportion of students with these risk factors that make them likely candidates for dropping out, appears to be growing, perhaps portending increasing dropout rates in the future.

CHAPTER 1
THEORETICAL FRAMEWORK

Data

The data examined here describes students who dropped out of school between the 10th and 12th grades—using two cohorts of 10th graders; one from 1980 and one from 1990.[9] The data for this report are from two studies within the National Longitudinal Studies Program of the National Center for Education Statistics—High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88). HS&B began with a base-year survey conducted in the spring of 1980 at which time surveys were administered to a sample of 36 seniors and 36 sophomores from each of a national probability sample of 1,015 high schools. More than 30,000 sophomores and 28,000 seniors enrolled in 1,015 public and private high schools across the nation participated. Questionnaires and cognitive tests were administered to each student in the sample. The administrator of each school filled out questionnaires as did a subset of parents. Also, complete transcripts for each student in the sample are available.[10]

In HS&B follow-up surveys have been conducted on the sophomores in 1982, 1984, 1986, and 1992. The first follow-up was able to identify those 1980 sophomores who were in the 10th grade in 1980 and who had dropped out by 1982. A separate questionnaire was administered to these dropouts, one which included items specifically designed to examine the students' decision to leave school.[11]

NELS:88 began with an 8th-grade cohort in 1988. The surveys were administered to an average of 23 students within each of a national probability sample of 1,052 schools. The first follow-up to NELS:88 was conducted in 1990 when most of the 8th-grade cohort were enrolled in 10th grade. The selection of students in the first follow-up was implemented in two stages. The first stage sampled all of the students who were in the 1988 cohort sample—the "core" students. The core student sample was then augmented through a process called "freshening," the aim of which was to provide a representative sample of students enrolled in the 10th grade in the 1989–90 school year. Freshening added another 1,229 10th graders who were not contained in the base-year sampling frame, either because they were not in the country or were not in the 8th grade in the spring of 1988. This tenth grade sample of students is the component of NELS:88 that

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[9] For convenience sake, this report sometimes refers to "10th to 12th grade" dropout rate. However, to be more precise, many of the 10th graders drop out and never reach the 12th grade. Therefore, this rate is more accurately referred to the dropout rate of 10th graders two years later.

[10] For a description of the actual samples, including the size of these samples, see appendix A at the end of this report.

[11] The sample used for HS&B was restricted to those students who responded to the base year and first follow-up surveys. The NELS:88 sample was restricted to those students responding to the first follow-up and second follow-up surveys, that is, the base year first follow-up panel members for HS&B, and the first follow-up and second follow-up panel members for NELS:88.

was used here. As with HS&B, questionnaires and cognitive tests were administered to each student in the first follow-up sample, and a separate questionnaire was administered to dropouts, one which included items specifically designed to examine the students' decision to leave school. Also, complete transcripts for each student in the sample are available.[12]

Using these two data sets, dropouts from school between the 10th and 12th grade were defined as those students who had been enrolled in the spring of their sophomore year, but who were not enrolled in school and had not completed school two years later when they should have been in the 12th grade. Two aspects of this definition are important to keep in mind. First, students who were enrolled in regular high school, *or an alternative program leading to an equivalency certificate* were considered to be students. Second, students who graduated high school with a regular diploma *or students who received an equivalent certificate* (such as those awarded for passing the GED) were considered completers and not dropouts. Obviously, adding or subtracting these alternative attendees and completers from our definition of dropouts would change the rates reported here. However, the definition used here corresponds to the definition used in the annual dropout report to Congress prepared by the NCES.

NELS:88 was designed to help researchers make comparisons with HS&B. Sophomores in the first follow-up of NELS:88 can be compared with the sophomores in the base year of HS&B. However, despite many similarities in design, there are also some sample definition and statistical design differences between the studies. These differences and the ways in which they affect the comparisons of the sophomore cohorts of 1980 and 1990 are discussed in appendix A of this report. In addition to similarities in sample design, many of the items in NELS:88 are directly comparable with the items in HS&B. However, in some instances, there were differences in the coding schemes for the variables. The details of these differences and how they were handled in this report can also be found in appendix A.

Framework

A wide variety of characteristics, such as individual, family, and academic background, have been identified as increasing a student's risk of dropping out of school.[13] In this paper we have selected and organized these characteristics around the dimensions outlined in figure 1. (Appendix A presents a detailed description of how these variables were created from the NELS:88 and HS&B datasets.) For this report this framework was used to organize the variables examined in the analysis rather than used as

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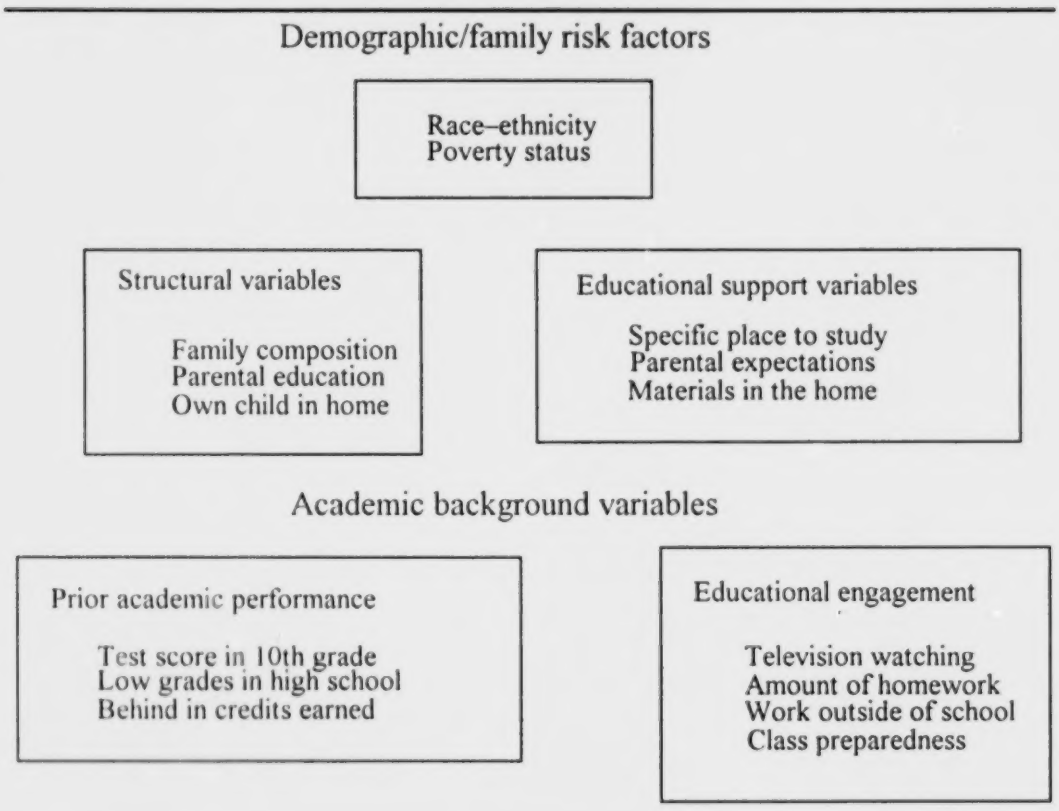
[12] The samples from HS&B and NELS:88 used here were analytic subsamples of students from the fall study. The analytic sample for HS&B was 14,102 students, and in NELS:88 it was 16,749 students. See appendix A for a full description of the samples.

[13] For a review of this literature see R. Rumburger, "Dropping out of Middle School: A Multilevel Analysis of Students and Schools," (a paper presented at the annual meeting of the American Educational Research Association, San Francisco, April 1992).

Figure 1—Variable framework for this report



a formal model to be tested within a multivariate environment (although a multivariate treatment of the data is summarized in appendix C).

Two broad categories of factors are presented in the framework in figure 1:1) demographic/family characteristics and 2) academic background characteristics. Demographic variables are further categorized into demographic, family structure, and educational support variables. Poverty status and race–ethnicity are treated separately from other family characteristics because of their importance in the research literature—often they are seen as the "givens" that drive the educational process. Other family risk factors are categorized into structural and educational support variables. Most of the research on family background factors has focused on the structural aspects of the family such as family composition and size. However, less emphasis has been placed on the educational support that families give to students—support that can be independent of the families' structural composition. Academic background factors are categorized into prior academic achievement and educational engagement variables.

One variable that is missing in the framework in figure 1 is gender. Although dropout *rates* did not vary substantially by gender in either the 1980 or 1990 cohort, prior research has shown that the *process* of dropping out may vary by gender; consequently, the effect of the risk factors in figure 1 may be different for males and females. Therefore, rather than adding a gender interaction term for each risk factor, the data for males and females were examined separately to determine whether there were any differences in how each variable was associated with dropout rates. Where gender differences are not apparent data are presented for the total sample only. Data for males and females are presented only when gender differences have an impact on how each factor was associated with dropout rates.

The major criterion for inclusion of variables was their theoretical or empirical association with poor school outcomes. That is, the relevant research based on at-risk youth was searched to create a model of dropping out of high school. Secondly, but no less important for this analysis, variables were chosen that were (or could be modified to be) comparable within both NELS:88 and HS&B. Given these restrictions, we have only been able to select a subset of all the variables that are desirable to fully model the dropout process. What remains is a framework of variables describing the process of dropping out between the 10th and 12th grades rather than a formal model. Nevertheless, this framework probably includes a fairly extensive set of variables representing a wide variety of concepts and factors, and provides a sound foundation for comparing the effect of risk factors in the two cohorts. Furthermore, the sample designs of the two datasets enable researchers to make inferences about a relatively large, nationally representative sample of 10th graders.

Conspicuously absent from this framework are any elaborate attempts to characterize differences in the schools attended by the two cohorts. Comparable variables describing various aspects of the student's school are, in fact available from HS&B and NELS:88.[14] We are fully aware that the demographics of "at riskness" are only a starting point for dropout prevention, and that by looking only at the individual characteristics and academic backgrounds of at-risk youth, one runs the risk of reinforcing "triage" models of dropout prevention. In fact, we believe that the term "at risk" is most accurately conceptualized as an interaction between the characteristics of the student's family, school, classroom, and neighborhood and the economic, political, and cultural environment. Consequently, any differences in educational outcomes over the last decade may be due to a fairly complex set of interactions between these different contexts.

While there may be problems with concentrating solely on the demographics of at-risk youth, these non-instructional influences on dropping out are still a good starting point for studying the prevalence of at risk characteristics. They not only set the context for examining the influence of school-level variables but also are of interest in their own right. For example, certain groups may have become more prominent over the last decade

[14]Also absent from this framework are variables describing the characteristics of the student's peer group or community. While some of these variables do exist in HS&B and NELS:88, the analysis of these are left for a forthcoming report.

among dropouts and may have changed the dropout phenomenon in ways that are not yet fully understood. In subsequent analyses we will explore some of the differences occurring in these other contexts between 1980 and 1990. In particular, we will explore how the school experiences of students with individual at-risk characteristics differed between 1980 and 1990.

CHAPTER 2
A COMPARISON OF THE CHARACTERISTICS OF THE SOPHOMORE CLASSES OF 1980 AND 1990

This chapter takes a closer look the risk factors outlined in figure 1, and describes some of the empirical literature that was used to justify their inclusion in this report. At the same time this chapter also describes, based on these risk factors, the changes in the population of 10th graders over the decade of the 1980s. As will be shown below, during this time several noteworthy changes occurred in the characteristics of 10th graders—in terms of both their family demographics and their prior academic achievement. Some of these changes put 10th graders more at-risk in 1990 than in 1980, some of the changes may have put them less at-risk. These shifts in the population will have important implications for the next chapter in which we examine declines in dropout rates over the decade and the factors that seem to be associated with those declines.[15]

Demographic Characteristics

Demographic characteristics: Poverty and race–ethnicity

Numerous studies have shown that one of the most powerful risk factors among young people is living in families that are persistently poor. Not only are children from poor families at risk for poor educational outcomes but they also are more at risk of other "rotten outcomes" including poor health, early and unwanted pregnancies, and criminal behavior.[16] Unfortunately, during the past decade there was a 35 percent increase in the proportion of sophomores living in families below the poverty line—from about 13 percent in 1980 to about 18 percent in 1990 (table 1).[17]

Furthermore, the sophomore cohort of 1990 was made up of greater proportions of minority students than was the sophomore class of 1980. In particular, the proportion of the class of 1990 who were from Asian or Hispanic backgrounds grew—thereby, increasing the language and cultural diversity of the sophomore class.[18] Asian students nearly tripled their representation in the sophomore class from 1.4 percent in 1980 to 4.0

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[15] All of the comparisons stated in this report are statistically significant at the 0.05 level. See appendix A for a discussion of how these tests were conducted.

[16] For a review of these studies, see L. Schorr, *Breaking the Cycle of Disadvantage* (New York: Anchor Books, 1988).

[17] The data on poverty need to be interpreted with caution. As one might suspect, there is a substantial amount of missing data on the income variable in both the NELS:88 and HS&B datasets. However, when one examines the missing data in relation to the composite socioeconomic status variable, the missing cases on income appear to be distributed uniformly across SES levels.

[18] The definitions of all the variables used in this analysis can be found in appendix A.

Table 1—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by race–ethnicity and poverty status

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Race–ethnicity		
Asian, Pacific Islander	1.4	4.0*
Hispanic	7.8	10.7*
Black, non-Hispanic	13.4	12.5
White, non-Hispanic	75.8	71.7*
Native American	1.6	1.1
Below poverty level		
Yes	13.0	17.6*
No	87.1	82.4*

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

percent in 1990. Moreover, Hispanic students increased from 7.8 percent of the class to 10.7 percent.[19]

Family Characteristics

Family individual characteristics: Structure

In addition to demographic characteristics, family characteristics have been shown to affect students' educational success. Both students from single-parent families and those from large families have been found to be at greater risk of school failure.[20] For example,

[19]Both HS&B and NELS:88 systematically excluded students from the sample who were deemed by the school coordinator not able to complete the questionnaire. This led to exclusion of an unknown number of language minority (LM) and limited-English-proficient (LEP) students. In both surveys, a Spanish language questionnaire was administered to those members of the sophomore cohort who preferred to take this version of the questionnaire.

[20]R. Ekstrom et al., "Who Drops Out and Why?" *Teachers College Record* 87 (1989): 335–56; A. Pallas et al., "Changing Nature of the Disadvantaged: Current Dimensions and Future Trends," 1989; R. Rumberger, "High School Dropouts: A Review of Issues and Evidence," *A Review of Education Research* 57 (1987): 101–21.

Zimilies and Lee,[21] in examining the HS&B sophomore cohort, found that although the differences were small, students from intact families had higher test scores and grade-point averages than did students from either step families or single-parent families. Further, the researchers found that in comparison with students from intact families, students from step families and single-parent families were between two and three times more likely to drop out of school between their sophomore and senior years.

Mirroring the trends shown in the data presented above, larger proportions of 1990 sophomores were from non-intact families—that is, families in which one or more of their biological parents were absent.[22] There was a 9 percent decrease in the proportion of students from intact families between 1980 and 1990. About 70 percent of 1980 sophomores were living in intact families, compared with 64 percent of 1990 sophomores (table 2).[23]

One of the most significant changes in the lives of young people over the last decade was the increase in the proportion of young people having children of their own. This fact is reflected in the data shown in table 2. Less than 1 percent of sophomores in 1980 had a child of their own living in their home (table 2). In 1990, 2 and a half percent had children living in the home. About 3 percent of female 10th graders in 1990 had a child at home compared about than 1 percent of female 10th graders in 1980. While official attendance policies concerning teenage childbearing have changed dramatically over the last decade (Title IX prevents districts from expelling students with children), the added burden of caring for a child of their own can make attending school almost impossible for some teenagers.[24]

However, while these increased percentages of "at risk" could potentially cause problems for the nation's high schools, most were not particularly dramatic. By these simple measures, more children appeared to be at risk in 1990 than in 1980, but not all children in 1990 exhibited those characteristics that traditionally have put them at risk for school failure. A majority of the 1990 sophomore class were from non-poor, white, and non-Hispanic backgrounds and lived in intact families. Almost 57 percent were in this category compared with 63 percent 10 years earlier.

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[21]H. Zimilies and V. Lee, "Adolescent Family Structure and Educational Progress," *Developmental Psychology* 27 (1991): 314–20.

[22]Some previous research has indicated the importance of the intact family for positive educational outcomes. For example, some have reported almost equal increased risk of dropping out for single-parent or remarried families. H. Zimilies, V. Lee, "Adolescent Family Structure and Educational Progress," *Developmental Psychology* 27 (1991): 314–20. However, others, including J. Finn, M. Owings (1994), find the effects on educational achievement of alternative family structures were reduced or eliminated for single-mother families when controlling for race and socioeconomic status.

[23]The presence of the "mother" or "father" in the home was determined by student self-reported data. In the case of adoptive parents, it is unclear whether the student would identify his or her adoptive parent as "mother" or "father" or as "step-mother" or "step-father."

[24]G. Wehlage et al., *Reducing the Risk: Schools as Communities of Support* (London: The Falmer Press, 1989).

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Table 2—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by family structure variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Family composition		
Intact family	69.6	63.5*
Two adults/step parents	8.9	15.2*
Single parent	17.2	18.1
Other	4.3	3.1*
Parent education, highest level		
HS grad/GED or less	42.0	29.2*
Some college or more	58.0	70.8*
Own children living in household		
Male		
Yes	0.4	1.8*
No	99.6	98.2*
Female		
Yes	0.8	3.1*
No	99.2	96.9*

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

While the families of students in 1990 were more likely to be minority, non-intact, and poor, the average educational attainment of the student's parents was *greater* in 1990 than in 1980.[25] Reflecting perhaps the overall increase in the educational level of the American population, about 71 percent of students in 1990 had parents who had attended at least some college, while only 58 percent of the 1980 sophomores had parents with this level of education.

[25] Due to relatively small sample sizes of parents without a high school diploma, those parents with only a high school diploma or certificate were grouped together in this variable with those without a high school credential.

Family characteristics: Educational support

Most of the previous research on the relationship between family background characteristics and educational outcomes has focused on family structure—socioeconomic status, family composition, and so on.[26] There has been little research on the relationship between other non-structural family variables, such as the amount of support the family gives to the education of the child. Several indicators of educational support were examined here: 1) whether the family had set aside a specific place for the student to study in the home; 2) the educational expectations the student's mother had for her child; and 3) the amount of reading materials in the home.

Several studies have shown that families who communicate the importance of education in their words and actions generally raise children who have better school outcomes, because they create home environments that allow learning to flourish. One way of communicating the importance of education is by allocating space in the home to study. In a comparative study of Chinese, Japanese, and American families, Stevenson and Stigler found that Asian families were much more likely to have set aside an area in the home for their children to do their homework.[27] They speculate that providing this space explains some of the achievement differences in Asian and American students—in other words, setting aside a study area in the home not only makes it easier for Asian students to study but also conveys to them that studying is important. In the cohorts of American sophomores examined in this study, there were significant differences in the proportion of students whose families had set aside a specific place for them to study—about 40 percent of 1990 sophomores compared with 47 percent of 1980 sophomores (table 3).

Students who have access to reading materials outside of the classroom have been given the opportunity by their families to increase their literacy abilities. If the home contains few reading materials, students may be getting the "wrong" message about the importance of learning. By this measure, sophomores in 1990 were no more at risk than their peers in 1980. The same proportion of sophomores in 1990 had newspapers and books in their home as did sophomores in 1980. About 69 percent in 1980 had these two types of reading materials in their home compared with 68 percent in 1990.

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[26]For an example of research on the way in which underlying family processes influence educational outcomes, see R. Rumberger, "Dropping Out of Middle School: A Multilevel Analysis of Students and Schools" (a paper presented at the annual meeting of the American Educational Research Association, March 1994).

[27]H. Stevenson, J. Stigler, *The Learning Gap* (New York: Summit Books, 1992).

Table 3—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by educational support variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Mother's expectation		
Less than HS or HS grad	11.8	5.6*
Vocational school	9.6	7.1*
Some college	11.5	14.9*
Complete college	26.0	45.7*
Graduate studies	21.3	20.2*
Don't know	20.0	6.5*
Specific place to study		
Yes	47.1	40.1*
No	52.9	59.9*
Number of types of reading materials[1]		
None	5.8	4.6
One	25.6	27.8*
Two	69.2	67.6

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

[1] Reading materials include two types of items: a newspaper and 50 or more books.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Between 1980 and 1990 the proportion of sophomores who said their mothers expected them to finish college increased dramatically—from 26 percent in 1980 to almost 46 percent in 1990. Perhaps more importantly, 20 percent of 10th graders in 1980 did not know how much education their mothers expected them to eventually receive, while in 1990 only about 7 percent did not know. It appears that 1990 mothers had done a better job of communicating their educational expectations to their children—and that their expectations were higher for their children than those of mothers of 10th graders in 1980.

Multiple family risk factors

There is strong evidence from studies of resilience that there are cumulative effects of risk factors.[28] For example, in a study of psychological disorder in children, Rutter found six family variables that were significantly associated with higher risk of psychiatric dysfunction.[29] Children with only one of these factors were no more at-risk than children with none. However, children with two factors were four times likely to develop disorders than were children with none or only one of the factors. Using the family risk factors above, table 4 indicates that sophomores in 1990 were no more likely than sophomores in 1980 to have multiple family risk factors.[30] In 1980, 45 percent of 10th graders had 2 or more risk factors, while in 1990, 43 percent could be so classified.

Table 4—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by multiple family risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Multiple family risk factors[1]		
None	21.9	21.4
One	32.7	35.6*
Two	23.2	22.2
Three	14.1	13.5
Four or more	8.2	7.4

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

[1] Family risk factors include: non-intact family composition; parent's education of high school graduate or less; having own child living at home; mother's expectation of less than high school or only high school graduate; not having a specific place to study; and having none of the types of reading materials at the home.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

[28]H. Yoshikawa, "Prevention as Cumulative Protection: Effects of Early Support and Education on Chronic Delinquency and Its Risks," *Psychological Bulletin* 115(1) (1994).

[29]M. Rutter, "Psychosocial Resilience and Protected Mechanisms," *American Journal of Orthopsychiatry* 57 (1987): 316–329.

[30]Due to the relatively large amount of missing data on poverty status, lowest socioeconomic quartile was inserted for poverty status in the count of risk factors. The other factors included: non-intact family composition, parent's education of high school graduate or less, having own child living at home, mother's expectation of only high school graduation or less, not having a specific place to study, and having none of the reading materials in the home.

Academic Background

Academic background: Educational engagement

By several conventional measures, sophomores in 1990 were more engaged in school than were their peers in 1980 (table 5). Sophomores in 1990 reported watching less television and doing more homework than did the sophomore class 10 years earlier, and they also reported coming to class prepared more often.

On the negative side, in 1990, greater proportions of 10th-grade students reported spending large amounts of time employed outside of school compared with 1980 10th graders. Participation in the labor market is time consuming. Studies that examine the number of hours worked generally find that there is a drop in school performance at around 20 hours per week. It appears, therefore, that it is not whether a student works but how much that is important.[31] Furthermore, some have argued that the types of jobs typically held by teenagers may, in fact, promote delinquent behaviors and foster the development of negative attitudes toward work itself.[32] However, in 1990, sophomores were slightly more likely to work 20 or more hours per week than were sophomores 10 years earlier.[33] In 1980, almost 20 percent worked 20 or more hours a week compared with almost 22 percent of sophomores in 1990.

Academic background: Prior performance

In addition to the changes in the individual and family characteristics of 10th graders during the last decade, sophomores in 1990 seemed to have been better prepared academically than were their peers in 1980. For example, on average 10th graders in 1990 scored about 12 percent higher on a test of mathematics skills in 1990 than 10th graders

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[31]S. Lamborn et al., "Putting School in Perspective: The Influence of Family, Peers, Extracurricular Participation, and Part-Time Work on Academic Engagement," in *Student Engagement and Achievement in American Secondary Schools*, ed. F. Newmann (New York: Teachers College Press, 1992).

[32]E. Greenberger, L. Steinberg, *When Teenagers Work: The Psychological and Social Costs of Adolescent Employment* (New York: Basic Books, 1986).

[33]An issue left unexamined in this report is whether students worked on weekdays or weekends. Work on school nights conceivably would have a more deleterious effect on school outcomes than work on the weekend. Unfortunately, while the NELS:88 survey instruments ask about work on weekends and weekdays, the HS&B survey asks about work in general, without reference to when the student works during the week. It would be interesting to know whether sophomores in 1990 worked more during the week (as opposed to the weekend) than did sophomores in 1980. However, this comparison is not possible with the data.

Table 5—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by educational engagement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Watch TV per day		
5 hours or less	72.4	90.8*
More than 5 hours	27.7	9.2*
Hours of work per week		
20 or less	80.4	78.2*
More than 20	19.6	21.8*
Homework per week		
None	7.0	7.2
More than 0 to 10	86.6	79.1*
More than 10 hours	6.5	13.7*
How often student attends class without books		
Often/sometimes	8.1	6.4*
Seldom/never	91.9	93.6*
How often student attends class without pencil or paper		
Often/sometimes	14.9	10.4*
Seldom/Never	85.1	89.6*

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table 6—Number of credits earned and test scores for the sophomore classes of 1980 and 1990

	1980 cohort	1990 cohort
Total credits[1] earned by the end of the 12th grade	19.7	22.3*
Academic credits[2] earned by the end of the 12th grade	13.1	16.3*
Total credits in 10th grade	10.6	11.8*
Academic credits in 10th grade	7.4	8.8*
Mathematics test score (number correct out of 58)	32.6	36.5*

[1]One credit represents 1 Carnegie unit.

[2] Academic credits are those earned in the academic curriculum as opposed to the vocational or personal use curricula.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

did in 1980.[34] Sophomores in 1990 answered 37 out of 58 items correctly compared with 33 out of 58 for 1980 10th graders (table 6).[35]

Furthermore, it appears from figure 2 that the mean scores for the 1990 cohort were not driven up by a few higher achieving students, but that there was a general shift in the distribution of scores to a higher level of achievement. Figure 2 is a Q and Q plot (quantile-quantile plot) which compares distributions of variables by graphing the quantiles of one distribution against the quantiles of another distribution.[36] For example, in creating figure 2, the students in the 1980 and 1990 cohorts were ranked according to their mathematics scores.[37] The student with the lowest mathematics score in 1980 (11.1) was

[34]The HS&B mathematics assessment was specifically equated to the NELS:88 mathematics assessment using item response theory (IRT). See K. Rasinski, S. Ingels, D. Rock, and J. Pollack, *America's High School Sophomores: A Ten Year Comparison, 1980-90* (Washington, D.C.: National Center for Education Statistics, 1992).

[35]Some of these data were also presented in M. McMillen, and P. Kaufman, *Dropout Rates in the United States: 1993* (Washington, D.C.: National Center for Education Statistics, September 1994).

[36]W. Cleveland, *Visualizing Data* (Summit, N.J.: Hobart Press, 1993).

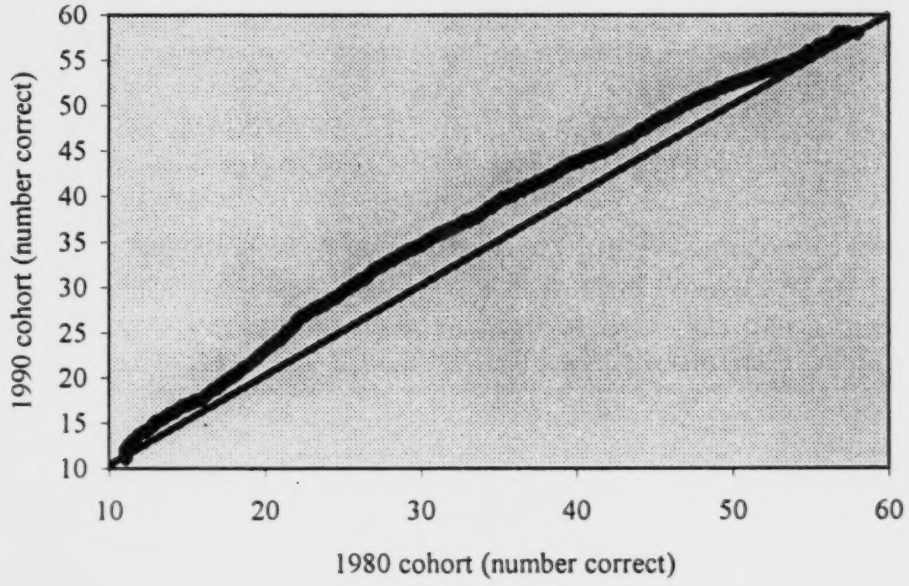
[37]For ease of computation and due to a limitation in graphics software, these are based on a random sample of 4,000 cases (weighted) from each dataset. When the sample sizes are not equal for the two variables, the computations are somewhat more complex.

then paired with the student with the lowest score in 1990 (11.1), the second lowest in 1980 (again 11.1) with the second lowest in 1990 (11.1), the median score in 1980 (33.0) with the median score in 1990 (38.8) and so on until the student with the highest score in 1980 (58.0) was paired with the student with the highest score in 1990 (58.0). The goal then is to study deviations in the plot from the line where each pair's scores were identical (i.e., the diagonal line shown in figure 2). If the distribution of scores for 1990 were different from that for 1980, then there should be some shift away from the diagonal in the data points representing pairs of students. In figure 2 there is a noticeable shift in the data up from the diagonal, indicating that the distribution of mathematics scores in 1990 was higher than the scores in 1980. However, there also appears to be less of a difference in the performance of students in the lowest decile and highest of both cohorts.[38] That is, their joint distribution is closer to the diagonal than other students.

In addition, by the end of the sophomore year, the average 10th grader in 1990 had earned more credits toward high school graduation than had the average 10th grader in 1980. On average, sophomores in 1990 had earned 11.8 credits by the end of their sophomore year, compared with only 10.6 credits learned by the class 10 years before (table 6). Most of this gain was in academic subjects. For instance, 1990 sophomores had accumulated 8.8 credits by the end of their sophomore year, compared with only 7.4 credits for the sophomore class of 1980. The Q and Q plot in figure 3 shows that these gains were consistent across the rest of the distribution of students, not just for high-achieving students.

[38]The lowest decile here corresponds to those students with scores below 20 correct.

Figure 2—Q and Q plot of mathematics test scores: Sophomore cohorts of 1980 and 1990

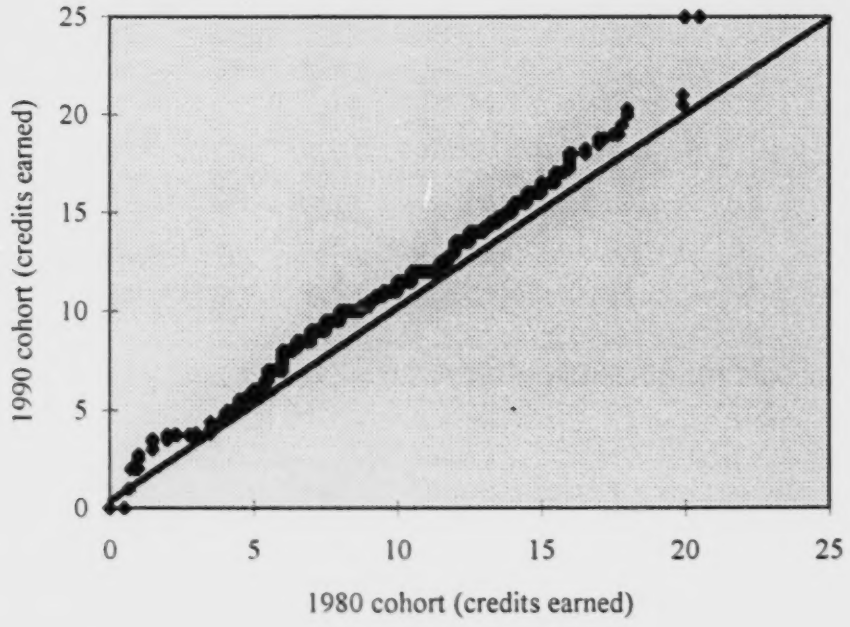


NOTE: Based on random sample of 4,000 cases (weighted) in each dataset.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Study, Sophomore Cohort, Base Year Survey, 1980. U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—Second Follow-up Transcript Study.

Academic progress can also be examined in a slightly different manner. Compared with the 1980 sophomores, a smaller proportion of 1990 sophomores were substantially behind in credits in the 10th grade (defined as fewer than 5 Carnegie units when approximately 22 were required for graduation). Only 1.8 percent of sophomores were this far behind in 1990, while 3.8 percent had fewer than 5 credits in 1980 (table 7). Almost 87 percent of 10th graders in 1990 were either on target or ahead in the amount of credits earned (10 or more units), while 71 percent were on target for graduation in 1980.

Figure 3—Q and Q plot of total credits earned at the end of the 10th grade: Sophomore cohorts of 1980 and 1990



NOTE: Based on random sample of 4,000 cases (weighted) in each dataset.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Study, Sophomore Cohort, Base Year Survey, 1980. U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988— Second Follow-up Transcript Study.

Furthermore, sophomores in 1990 had slightly higher grades than did sophomores in 1980. Perhaps more importantly for this analysis, only 11 percent of 10th graders in 1990 had grade-point averages below "D" in 10th grade compared with 14 percent in 1980. However, a greater proportion of 1990 sophomores than 1980 sophomores had repeated a grade before entering high school. Specifically, 14 percent of 10th graders in 1990 had repeated a grade before the 9th grade compared with 11 percent of 10th graders in 1980.

Table 7—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by prior academic achievement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Low grades		
D and below	13.6	10.8*
C	39.3	38.1
B	36.7	38.8*
A	10.4	12.3*
Credits earned		
Below 5	3.8	1.8*
5–10	24.8	11.6*
10 +	71.4	86.6*
Remedial English		
Yes	34.5	18.7*
No	65.5	81.3*
Remedial Math		
Yes	34.5	19.6*
No	65.5	80.4*
Ever repeat a grade		
Yes	11.4	13.6*
No	88.6	86.4*

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Multiple academic risk factors

In contrast to their equal number of family risk factors, students in the 1990 sophomore cohort, were less likely to have multiple academic risk factors present (table 8).[39] About 41 percent of the 1980 cohort had two or more academic risk factors, compared with about 28 percent of the 1990 cohort.

[39] Academic factors include: watching more than 5 hours of TV per day; working more than 20 hours per week; doing no homework per week; often or sometimes attending class without books; often or

Table 8—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by multiple academic risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Multiple academic risk factors[1]		
None	34.3	46.4*
One	24.3	25.3
Two	19.9	15.1*
Three	12.5	7.6*
Four	5.8	3.7*
Five or more	3.1	1.9*

* indicates that the 1990 estimate is significantly different at the .05 level than the similar estimate in 1980.

[1] Academic factors include: watching more than 5 hours of TV per day; working more than 20 hours per week; doing no homework per week; often or sometimes attending class without books; often or sometimes attending class without paper or pencil; low math test scores; D and below average grades; below 5 credits earned by end of 10th grade; taken remedial math; taken remedial English; ever repeated a grade.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Changing Nature of At-Risk Population

While some of the changes that occurred in the structure of the family between 1990 and 1980 seem to have put more students at risk of school failure, there were some changes in family process and functioning during the period that may have had positive educational outcomes. While sophomores in 1990 were more likely than 1980 10th graders to be from minority backgrounds and from non-intact families living below the poverty line, sophomores in 1990 were also less likely to have parents with only a high school education (or less than a high school education), and they were more likely to have a clear idea of their mother's expectations for their further education. One change that took place between 1980 and 1990 concerned the proportion of 10th graders who had children. While the proportion of 1990 10th graders with children of their own at home was still quite small, it did represent a 38 percent increase for females over the proportion in 1980.

sometimes attending class without paper or pencil; low math test scores; D and below average grades; below 5 credits earned by end of 10th grade; taken remedial math; taken remedial English; ever repeated a grade.

However, despite the fact that the 10th-grade class of 1990 had a larger proportion of students with characteristics traditionally associated with at-risk status, the 1990 class was somewhat more academically prepared in the 10th grade than were their peers in 1980. For example, they had earned more credits by the 10th grade; fewer had low grades; and they did more homework and watched less television.

It is then difficult to say whether the 1990 sophomore class was more or less at risk than the 10th-grade class 10 years earlier. Clearly, many factors put them at more risk. The increase in the number living in poverty was particularly salient. However, other factors (including school/educational program factors, which will be examined in a later report) may have buffered the effect of some of these negative factors. From the data presented here, while the home environments seem to be less conducive to learning in 1990 than in 1980, parents in 1990 appear to have been more involved in their children's education in terms of communicating educational expectations to their child. Certainly, the 10th-grade class in 1990 was in better shape academically than their peers in 1980. Many more were well along their way to graduation, despite the status of their families. Given these changes in the population of students in 1980 and 1990, what in fact happened to them 2 years later in 1982 and 1992? This is the topic of the next section of this report.

CHAPTER 3
A COMPARISON OF SOPHOMORE TO SENIOR DROPOUT RATES FROM THE SOPHOMORE CLASS OF 1980 AND 1990

The last chapter showed that in the spring of its sophomore year, the 10th-grade class of 1990 had larger proportions of students who could be classified as at risk by their individual and family background characteristics (though not by their educational support and prior achievement characteristics). Given the known relationship between these factors and dropping out of school, all things being equal, dropout rates should have increased over the last decade from the 11.4 percent dropout rate in 1980–82. In fact, applying the 1980 dropout rates to the 1990 demographic characteristics results in an estimated dropout rate of 12.0 percent.[40] That is, due to increases in the proportion of 10th graders from minority, poor, and single parent families, dropout rates should have increased by about one half of a percentage point between 1980 and 1990. Even when one factors in the positive changes in educational support and prior achievement between 1980 and 1990, the predicted dropout rate only drops slightly to 11.6 percent. In fact, as table 9 demonstrates, dropout rates declined by 5.2 percentage points over this decade (table 9).[41] About 11 percent of the 1980 10th-grade class had dropped out, compared with only 6 percent of the 1990 class. In addition, while males dropped out at higher rates than females in 1980–82, male and female dropout rates in 1990–92 were not significantly different.

This chapter attempts to examine how and why dropout rates declined. Two related questions are explored:

- What was the association of known at-risk factors with dropping out in the two cohorts of students.[42] Did these factors have similar effects across the decade?

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[40]The 12.0 percent is an estimate of what the 1990 dropout rate would be if the 1980 relative rates had remained constant. A regression standardization procedure was used in which the 1990 population characteristics were inserted into a regression equation predicting dropping out in the 1980 cohort. For an explanation of the technique see O. Duncan, "Inheritance of Poverty or Inheritance of Race," in *On Understanding Poverty*, ed. D.P. Moynihan (New York: Basic Books, 1969).

[41] Use of different definitions of dropping out of school would have resulted in different rates of dropping out. Specifically, a definition was used in this report that counted as completers (non-dropouts) those students who received an alternative credential, such as awarded after passing an equivalency exam such as the GED. Counting these students as dropouts, as some researchers would do, would have increased the dropout rates for both cohorts.

[42]In strict terms what is observed here are "associations" rather than "effects." Without a full multivariate treatment of the data, one has to be cautious in attributing cause and effect to any of the variables we will examine here. However, for convenience, we have chosen to use the terms such as "effects," "impacts," and "influences" in this report rather than the more accurate, but grammatically awkward "associations."

- Were the declines in dropout rates shared uniformly by all groups of students, or were declines more striking for some groups?

The data are presented in two ways: 1) in dropout rates—the proportion dropping out who had a particular characteristic; and 2) in odds ratios—the relative odds of a student with that characteristic dropping out compared with some reference group. Each statistic highlights a different characteristic of the dropouts from each high school cohort. The *dropout rate* shows the absolute risk of dropping out for a student with some characteristic, and the simple *odds ratio* shows the relative risk of dropping out for students with that characteristic. Each statistic is important to understanding the declines in dropout rates over the decade. Dropout rates may have declined, but declined in such a way that the relative risk of dropping out for various groups remained constant. Or, dropout rates may have declined more for some groups than others, changing the relative risk of some group of students dropping out.

Table 9—Tenth to twelfth grade dropout rates by gender: 1980–82 and 1990–92

	1980 cohort		1990 cohort	
Status in 10th grade	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Gender				
Male	12.4	1.22	5.7*	(0.84)*
Female	10.4		6.7*	

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

For example, one can examine the difference in the dropout rates between the two cohorts to determine if rates declined for specific subpopulations. Table 9 shows that the rates for both males and females dropped between 1980–82 and 1990–92. However, this will tell us nothing about the decline of male dropout rates relative to the decline of female rates. One way of assessing this relative decline is to examine the odds ratios for males and females for each cohort. For example, the odds that a male student dropped out between 1980 and 1982 were 12.4/(100-12.4) or 0.14, and the odds that a female student dropped out were 10.4/(100-10.4) or 0.12. The odds ratio comparing males with females was

0.14/0.12, or about 1.22, indicating that being male rather than female increased by a factor of 1.22 the odds of an 10th grader in 1980 dropping out by 1982 (or 22 percent). In other words, male students were 22 percent more likely to drop out as were female students. (No difference in odds would result in an odds ratio of 1.00.) In contrast, the odds ratio comparing male students with female students in 1990 was 0.84, indicating that males were about 16 percent less likely to drop out in terms of odds compared with females (0.84–1.00). (The statistical test on this odds ratio indicated that it was not significantly different than 1.00. To denote non-significance, this odds ratio is enclosed in parentheses in table 9.) Overall, these data indicate that while males dropped out at higher rates in 1980-82 than did females, males and females dropped out at similar rates in 1990-92; and both males and females dropped out in 1990-92 at rates below those for their counterparts in 1980–82.

For each factor presented below, the odds ratios have been calculated within each cohort based on some reference group. For example, each racial–ethnic group's dropout rate in the 1980 cohort was compared with the white group's rates in the 1980 cohort—"white" being the reference group for the race–ethnicity variable.[43] It is important to note that these factors were examined here in a univariate context only. That is, the odds ratios shown here are raw or univariate odds ratios—they are simply the ratio of the odds of students with one characteristic (e.g. white) vs. students with another characteristic (e.g. black) ignoring other, perhaps confounding, factors. Using the statistical methods employed in this study, one could also calculate *multivariate* odds ratios—odds ratios controlling for other related factors. For example, one could examine differences in the odds of dropping out for black and white students, controlling for (or holding constant) their poverty status. For the sake of simplicity only the univariate odds ratios were presented in the text of this report. However, for those readers interested in the multivariate results, appendix C summarizes the results of a multivariate treatment of the data.[44]

To reiterate, these rates and odds ratios were examined with several issues in mind. First, we were interested in the effects of particular characteristics on students' likelihood of dropping out of school between the 10th and 12th grades. Secondly, we were also interested in whether these effects, if they existed, had changed over time from 1980 to 1990. Finally, we were interested in whether some groups of students rates declined more

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[43]It is important for the reader to keep in mind that the odds ratios presented in this report are not equivalent to the ratio of percentages. For example, the percentage of Hispanic students dropping out was 19.2 percent in 1980–82, while the percentage of white students dropping out was 10.2 percent in 1980–82 (table 10). The ratio of the percentage of Hispanic students to white students dropping out was 19.2/10.2 or 1.88, while the odds ratio comparing Hispanics to whites was (19.2/(100–19.2)/10.2/(100–10.2)) or, without rounding, 2.12. In terms of the percentages, therefore, Hispanics were 90 percent more likely than whites to drop out, while in terms of odds they were 101 percent more likely to drop out. In this report we use the terms "more likely" and "less likely" to refer to the change in the odds, rather than the change in percentages.

[44] The full version of the multivariate results is contained in P. Kaufman, *Failing The Grade: A Comparison Of High School Dropouts In 1982 And 1992*, a paper presented to the Annual Meeting of the American Educational Research Association, Toronto, August 1994.

than others and thus changing the relationship between the at-risk factors and dropping out.

Demographic Characteristics

Dropout rates declined between 1980 and 1990 for almost all racial–ethnic groups (table 10). However, while dropout rates decreased for many minority group members, their dropout rates relative to whites remained fairly constant. That is, dropout rates for minority students fell more or less proportionately to those of whites. This can be seen perhaps more easily in the odds ratios also presented in table 10. Between 1990 and 1992, the odds of a black student dropping out was about 65 percent higher than that of a white student—not statistically different at the .05 level than the 38 percent higher odds in 1980–82. Similarly, the odds of an Hispanic student dropping out remained about two to three times that of whites between 1990 and 1992.

The exception to this pattern was the rates for Asian students. Their rates increased overall between 1980–82 and 1990–92 and increased relative to the rate for white students. In 1980, Asian students dropped out at lower rates than whites, whereas in 1990 they dropped out at the same rate as whites.

In contrast to the overall declines in dropout rates for students from almost all racial–ethnic backgrounds, dropout rates did not decline appreciably for students living in poverty. The dropout rates for students living in poverty remained fairly constant between 1980 and 1990—between 13 and 15 percent of such students dropped out of school between the 10th and the 12th grades (table 10). Dropout rates declined during the decade for students in non-poor families only—from 7.0 percent in 1980 to 3.9 percent in 1990. That is, students living in poverty did not share in the overall decline in dropout rates seen over the decade and even though they dropped out at similar rates in 1980 and 1990, being from a poor family in 1990 put students at greater relative risk of dropping out than in 1980. In 1980, being from a family below the poverty line increased the odds of dropping out relative to other students by a factor of 2.25 (table 10). In 1990, it increased the odds of dropping out by a factor of 3.71, making poverty a greater risk.

Table 10—Dropout rates, by race–ethnicity and poverty status: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Race–ethnicity				
Asian, Pacific Islander	1.8	0.17	4.2	(0.98)*
Hispanic	19.2	2.12	12.1*	2.64
Black, non-Hispanic	13.5	1.38	7.9*	1.65
White, non-Hispanic	10.2		5.0*	
Native American	26.9	3.25	17.0	3.94
Below poverty level				
Yes	14.5	2.25	12.9	3.71*
No	7.0		3.9*	

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Family Characteristics

Family characteristics: Family structure

The relationship between dropping out and most of the characteristics of the students' family structure remained fairly constant over the decade. Students from single parent families dropped out at higher rates than students from intact families and female students who had children of their own in the 10th grade were more likely to drop out. In both cohorts the relative odds of dropping out was about twice as high for step-parent and single-parent families as it was for intact families, and although the dropout rates declined, these relative odds did not change appreciably during the decade (table 11). The decline in the dropout rate for students with children at home (both males and females) appears to have not been proportional to the decline in dropout rates for other students. That is, the

Table 11—Dropout rates, by family structure variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Family composition				
Intact family	6.4		4.6*	
Two adults/step parents	14.5	2.46	8.2*	1.84
Single parent	12.5	2.10	8.8*	1.97
Other	21.5	4.01	10.9*	2.53
Parent education, highest level				
HS grad/GED or less	12.6	1.95	11.3	3.49*
>HS grad/GED	6.9		3.5*	
Own children living in household				
Male				
Yes	15.9	(1.84)	7.7	(1.42)
No	9.3		5.5*	
Female				
Yes	37.8	6.96	18.5*	3.39
No	8.1		6.3*	

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

relative risk of dropping out in 1990–92 for students with children appeared to be higher than the relative risk in 1980–82. However, this difference was not statistically significant.

However, the relationship between parental education and dropping out did change over the decade. The relative risk of dropping out for students whose parents had at most a high school diploma was greater in 1990 than in 1980. Almost all of the decline in dropout rates came from students with college educated parents (or at least they had "some" college). Since dropout rates for students with less educated parents remained constant while the rates for other students declined, the relative difference, in terms of

odds, between these groups of students increased between 1980 and 1990. Having parents without college experience increased the odds of dropping out in 1980 by a factor of almost 2, while it increased the odds of dropping out in 1990 by a factor of 3.5 (table 11).

Family characteristics: Educational support

Several of the items in the group of variables we have labeled "educational support," had a powerful effect on the propensity to drop out of school (table 12). However, none of these relationships seemed to have changed much over the decade. Of particular interest in this group of variables was mother's expectations.

In both cohorts, students who said their mother expected, at best, for them to finish only high school were five to 10 times more likely in terms of odds to drop out than students whose mothers expected them to finish college. However, the interpretation of a mother's stated expectations for a child's education is not unambiguous. Low expectations may reflect her own desires and expectations for her child or it may merely reflect her realistic evaluations of the educational prospects of her child.

Perhaps more interestingly than low expectations, students in both cohorts of sophomores who reported that they did not know what their mother expected of them were two to three times more likely to drop out than students whose mothers expected them to finish college.

The amount of reading materials in the home also had a large impact on the propensity for students in both cohorts to drop out of school. Students without a daily newspaper or more than 50 books in the home were about 2.5 times more likely to drop out as were other students.

Multiple family at-risk factors

As previously mentioned, investigators from a variety of disciplines looking at a variety of outcomes (e.g. delinquency, psychological disorder), have noted that at-risk factors seem to have a multiplicative effect. The presence of more than one factor seems to be more than the sum of the effects of individual. This also seems to be true of the sophomore cohort of 1990 but not the cohort of 1980 (table 13). In both cohorts, students with multiple risk factors were more likely to drop out than were students with no risk factors—generally the greater the number of risk factors the higher the chance that the student would drop out. However, for the 1990 cohort, the impact of having more risk factors was not just cumulative (having two was twice as bad as having one), but was multiplicative. For example, 10th graders in 1990 with three factors were not three times as likely to drop out as those with none, but were five times as likely. This was due to the fact that dropout rates for students with no or only one family risk factors present decreased rather dramatically over the decade while dropout rates for students with more than two risk factors present changed little. That is, students with more than two risk factors did not share in the overall decline in dropout rates.

Table 12—Dropout rates, by educational support variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Mother's expectation				
Less than HS or HS grad	20.5	5.87	23.1	9.78
Vocational school	10.4	2.61	10.3	3.74
Some college	7.0	1.72	4.5*	(1.34)
Complete college	4.2		3.0*	
Graduate studies	4.5	(1.07)	4.4	(1.49)
Don't know	10.1	2.56	10.7	3.16
Specific place to study[1]				
Yes	7.2		5.1	
No	8.9	1.20	5.6	(1.09)
Number of reading materials at home[2]				
None	12.8	2.51	10.9	2.51
One	8.9	1.67	7.6	(1.67)
Two	5.6		4.7	

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

[1] Due to the presence of missing data, the total dropout rate is larger than the rate for having and not having a place to study.

[2] Reading materials include two types of items: a newspaper and 50 or more books.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table 13—Tenth to twelfth grade dropout rates, by multiple family at-risk factors: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Multiple factors				
None	6.9		2.9*	
One	10.2	1.55	3.2*	1.13
Two	10.0	1.50	6.6*	2.40
Three	12.8	1.99	13.1	5.11*
Four or more	18.2	3.03	16.2	6.53*

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Academic Background

Academic background: Educational engagement

As might be expected, students who were less engaged in school in the 10th grade were more likely to drop out by the 12th grade. In both cohorts, students who watched a great deal of television, did little homework, often came to school unprepared, or whose attention was pulled away from school by work, all tended to drop out at higher rates than other students. In addition, the association of these variables with dropping out were fairly constant over the decade.

For example, in both cohorts, the number of hours worked during the week showed consistent (and powerful) association with dropping out. Dropout rates were about twice as high for students who worked more than 20 hours per week. In 1990, these students were about 92 percent more likely in terms of odds to drop out, and in the 1980 cohort they were about 103 percent more likely (table 14).

Table 14—Dropout rates, by educational engagement variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Watch TV per day				
5 hours or less	8.4		5.1*	
More than 5 hours	9.1	(1.08)	10.2	2.14*
Hours of work per week				
20 or less	7.6		4.9*	
More than 20	14.3	2.03	9.1*	1.92
Homework per week				
None	26.0	4.18	15.1*	3.10
>0–10	7.7		5.4*	
More than 10 hours	4.7	0.59	2.0*	0.35
How often student attends class without paper/pencil				
Often/sometimes	15.3	2.18	8.1*	1.46*
Seldom/never	7.6		5.7*	
How often student attends class without books				
Often/sometimes	18.8	2.72	11.1*	2.12
Seldom/never	7.9		5.6*	

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Academic background: Prior performance

Poor academic achievement has long been recognized as an early indicator of a student's disengagement from school and increases the likelihood that the student will eventually drop out. While the previous section indicated that the sophomore class of 1990 generally demonstrated higher levels of academic achievement than did the class of 1980, table 15 shows that poor academic achievement in the 10th grade was associated with dropping out of school for both cohorts. That is, even though low performers in 1990 were functioning at a somewhat higher academic level than low performers in 1980, low academic performance was still strongly associated with dropping out.

In fact, these relationships were slightly stronger in 1990 than in 1980. In 1980, students in the lowest decile of mathematics achievement were about 3 times more likely, in terms of odds, to drop out of school between the 10th and 12th grades; in 1990 similar students were more than five times as likely. Students who had taken remedial mathematics or English before the 10th grade were one and one half times as likely to drop out in 1980 while comparable students were 3 times as likely to drop out in 1990. This increase in the strength of these relationships was due to the fact that almost all of the decline in dropout rates resulted from lower rates for higher achieving students. There was little change in the rates for students with relatively poor prior academic records. (In fact, though not statistically significantly different, the estimates for some of these rates were higher in 1990 than were comparable rates in 1980.)

Multiple academic risk factors

In both cohorts the number of academic risk factors were strongly associated with higher dropout rates—only a small proportion of students with no factors dropped out while over a third of students with 5 or more risk factors present dropped out (table 16). However, as was the case with family risk factors, the only group of students whose rates declined between 1980–82 and 1990–92 were students with either no or only one academic risk factor present. Dropout rates for students with no risk factors decreased by 73 percent (6.4 percent to 1.7 percent), while the dropout rate for students with only one risk factors present decreased by about 51 percent (10.5 percent to 5.1 percent).[45] This resulted in an increase in the relative risk for students with multiple risk factors. In 1980, a student with 5 or more academic risk factors was about 8 time more likely, in terms of odds, to drop out. In 1990, a similar student was 29 times more likely.

[45] Students with only one risk factor in 1990 were still 3 times more likely to drop out that students with none of these factors.

Table 15—Dropout rates, by prior academic achievement variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Low mathematics test score[1]				
Yes	18.0	2.97	19.1	5.58*
No	6.8		4.1*	
Grades				
D and below	37.1	54.6	26.1*	284.3*
C	10.3	10.6	6.9*	60.3*
B	2.6	(2.5)	0.8*	6.6
A	1.1		0.1	
Credits earned				
Below 5	51.2	21.33	46.2	29.08
5–10	19.8	5.05	21.2	9.12*
10 +	4.7		2.9*	
Remedial English				
Yes	11.1	1.52	12.2	3.10*
No	7.6		4.3*	
Remedial Math				
Yes	12.4	1.95	13.4	3.74*
No	6.8		4.0*	
Ever repeat a grade				
Yes	31.0	4.57	14.8*	4.39
No	8.9		3.8*	

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

[1] Scoring in the lowest decile for their cohort

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table 16—Tenth to twelfth grade dropout rates, by multiple academic at-risk factors: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	11.4		6.2*	
Multiple academic factors				
None	6.4		1.7*	
One	10.5	1.72	5.1*	3.13*
Two	12.4	2.08	10.7	7.03*
Three	16.0	2.77	14.3	9.78*
Four	22.0	3.60	19.7	16.61*
Five or more	34.2	7.61	32.7	28.50*

* indicates that the 1990 estimate (rate or odds ratio) is significantly different at the .05 level than the similar estimate in 1980.

NOTE: Variables in parentheses denote odds ratios not significantly different from 1.00. Odds ratios not in parentheses *are* statistically significantly different at the .05 level than 1.00.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey and First Follow-up Survey, 1980 and 1982; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

CHAPTER 4
A COMPARISON OF THE CHARACTERISTICS OF DROPOUTS FROM THE SOPHOMORE CLASS OF 1980 AND 1990

The second chapter of this report described the changes that occurred in the characteristics of sophomores between 1980 and 1990. The third chapter examined in some detail the changes in the relative rate of dropping out over that decade for students with various characteristics. This chapter shows how the changes in the characteristics of the population at risk, and the changes in the relative risk of dropping out for those characteristics combined to produce changes in the characteristics of the population of dropouts between 1980 and 1990. That is, changes in the characteristics of the population, coupled with changes in the relative rates of dropping out, resulted in changes in the distribution of characteristics of the population of dropouts—dropouts in 1990 "looked" different than dropouts in 1980.

In a sense, these two statistics work in tandem. If students with a particular characteristic increased in proportion to other students in the population, other factors being equal, one would expect them to be a greater proportion of dropouts. If their relative rate of dropping out increased one would also expect them to be a greater proportion of dropouts. For example, table 17 summarizes the results of chapters two and three for the characteristics of race-ethnicity and poverty. Column two of table 17 indicates if the proportion of students with the indicated characteristic increased (↑) decreased (↓), or that there was no evidence of either an increase or decrease (=).

Column three uses these three symbols to indicate the change in the relative odds of dropping out in each of the racial-ethnic groups (here in reference to white, non-Hispanic students). There was an increase between 1980 and 1990 in the proportion of the sophomore class comprised of Asian students (from 1.4 percent to 4.0 percent shown in table 1). Data from this table also indicate that there was an increase in the relative odds of an Asian student dropping out (from a relative odds ratio of 0.17 in 1980 to an odds ratio of 0.98 shown in table 10). Table 18 displays the resulting dropout population distribution. An increase in the overall population share of Asian/Pacific Islander students, plus an increase in their relative rate of dropping out, led to an increase in the proportion of *dropouts* from Asian backgrounds—from 0.2 percent of all dropouts in 1980 to 2.7 percent in 1990 (table 18).

Similarly, an increase in the proportion of Hispanics in the population of 10th graders, coupled with a constant rate of dropping out over the decade, resulted in a larger proportion of dropouts in 1990 who were Hispanic, while a smaller proportion of dropouts were white (table 17). The proportion of dropouts who were black remained constant at about 16 percent.

Table 17—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by race–ethnicity and poverty status

Variable	Change in % of population	Change in relative odds
Race-ethnicity (relative to whites)		
Asian, Pacific Islander	↑	↑
Hispanic	↑	=
Black, non-Hispanic	=	=
White, non-Hispanic	↓	reference
American Indian, Alaskan	=	=
Below poverty level		
Yes	↑	↑
No	↓	reference

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

An increase in both the rate and population proportion of students living in poverty resulted in an increase in the proportion of all dropouts from poor backgrounds. While in 1980, only about a quarter (24 percent) of dropouts were from poor families, in 1990, approximately 42 percent were living in poverty.

Part of the increase in proportion of Asian and Hispanic dropouts was due to the changing mixture of persons grouped within the category labeled Asian/Pacific Islander or Hispanic. While the Asian/Pacific Islander and Hispanic sample sizes within NELS:88 and HS&B databases are too small to make reliable comparisons, data from the Decenial Census show that the characteristics of the population of these groups in 1990 were quite different than the same population 10 years earlier.

Table 18— Percentage distribution of 10th-grade dropouts within the cohorts of 1980 and 1990, by race–ethnicity and poverty status

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Race-ethnicity		
Asian, Pacific Islander	0.2	2.7*
Hispanic	13.1	20.9*
Black, non-Hispanic	15.8	15.9
White, non-Hispanic	67.2	57.4*
American Indian, Alaskan	3.7	3.1
Below poverty level		
Yes	23.5	41.7*
No	76.5	58.3*

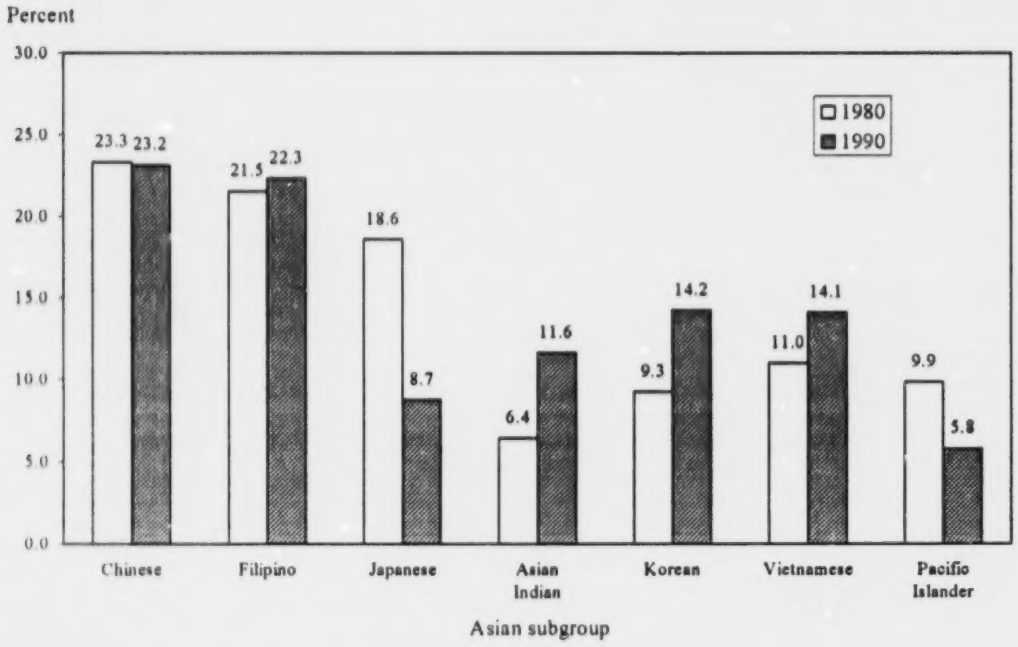
* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Specifically, in 1990 there were proportionately more Vietnamese, Korean, and Asian Indians in the group of peoples classified as Asian than there were in 1980 (Figure 4). Two of these groups also were among those with the highest proportion of high school non-completers (figure 5). For example, those 15- to 19-year-olds labeled Vietnamese increased from 9.3 percent of the Asian/Pacific Islander population in 1980 to 14.2 percent in 1990. Those labeled Japanese decreased from 18.6 percent of the Asian/Pacific Islander population to 8.7 percent. Compared to only 8.6 percent of Japanese 18 to 24 year olds, almost 32 percent of Vietnamese 18- to 24-year-olds in 1990 did not have a high school credential. In addition, although Pacific Islanders comprised a smaller proportion of the Asian population in 1990 than in 1980 (down to 5.8 percent from 9.9 percent), the percentage of this subgroup who were dropouts in 1990 (21 percent) was second only to the Vietnamese.

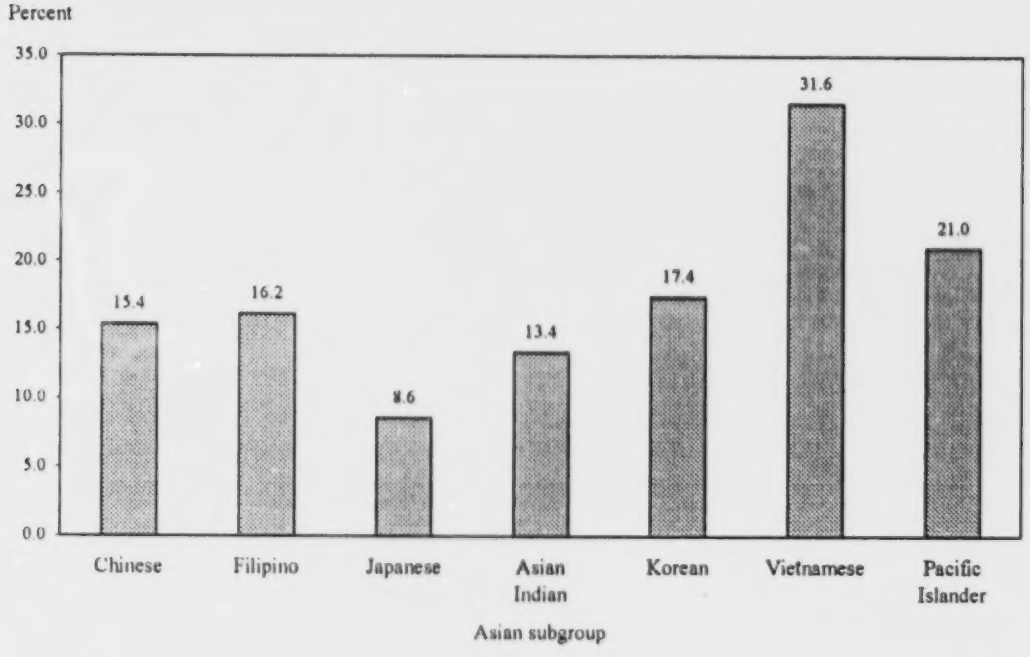
Changes in the population mix of Hispanic 15- to 19-year-olds were less dramatic than those of Asians, but the results were similar (figures 6 and 7). Those subgroups that gained in share of the Hispanic population (e.g. Mexican Americans) were also those Hispanics with the largest non-completion rates. Those that lost population share (e.g. Cuban Americans), were those traditionally with the lowest non-completion rates.

Figure 4—Percentage of the Asian/Pacific Islander 15- to 19-Year-Olds by Asian subgroup: 1980 and 1990



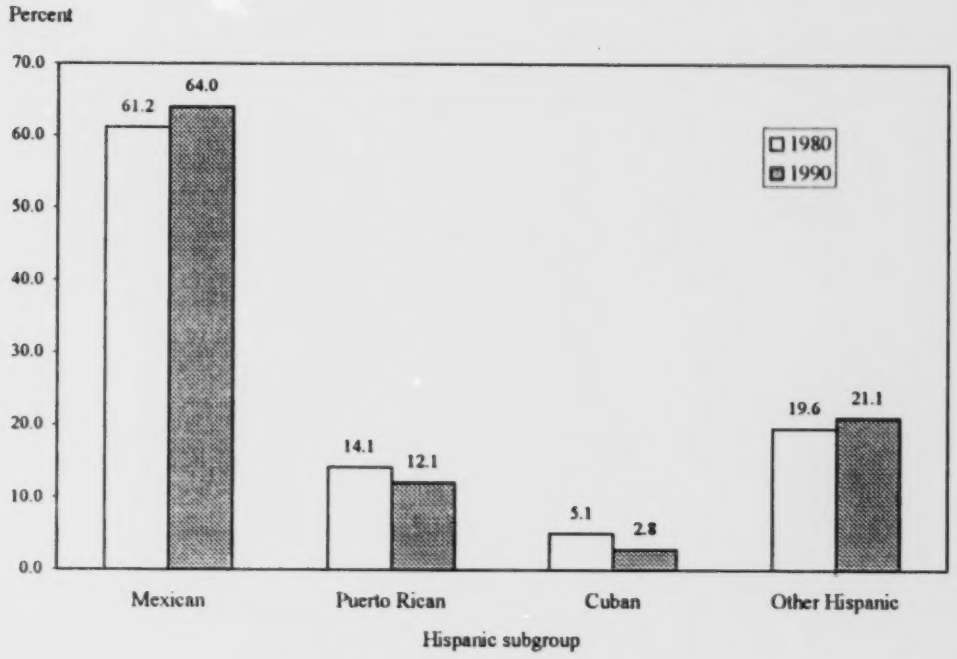
SOURCE: U.S. Department of Commerce, Bureau of the Census, *1980 Census of the Population: General Population Characteristics of the United States*, 1980; and U.S. Department of Commerce, Bureau of the Census, *1990 Census of the Population: General Population Characteristics of the United States*, 1990.

Figure 5—Percentage of Asian/Pacific Islander 18- to 24-year-olds who have not completed high school: 1990



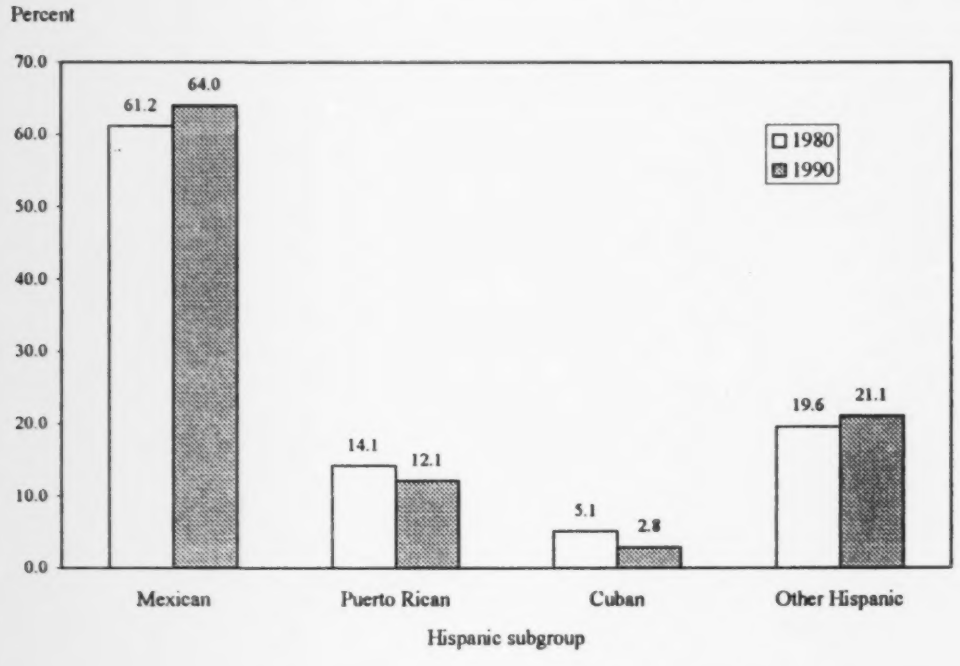
SOURCE: U.S. Department of Commerce, Bureau of the Census, *1990 Census of the Population: General Population Characteristics of the United States*, 1990.

Figure 6—Percentage of the Hispanic 15- to 19-Year-Olds by Hispanic subgroup: 1980 and 1990



SOURCE: U.S. Department of Commerce, Bureau of the Census, *1980 Census of the Population: General Population Characteristics of the United States*, 1980; and U.S. Department of Commerce, Bureau of the Census, *1990 Census of the Population: General Population Characteristics of the United States*, 1990.

Figure 7—Percentage of Hispanic 18- to 24-year-olds who have not completed high school: 1990



SOURCE: U.S. Department of Commerce, Bureau of the Census, *1990 Census of the Population: General Population Characteristics of the United States*, 1990.

Family Characteristics

Family characteristics: Family structure

Table 19 summarizes the results from chapters two and three for those variables that were grouped within the family structure category. Along with table 20, these data indicate that there were three noteworthy aspects to the changes in family structure witnessed during the decade of the 1980s. Decreasing proportions of all students from intact families, and increases in the proportion of all students who had a child of their own living with them in the 10th grade resulted in increases in the proportion of dropouts with these characteristics. This occurred despite the fact that the relative odds of dropping out for students with these characteristics remained unchanged. Students with these characteristics did not drop out at proportionally higher rates than other students, there just were more of them around in 1990 to drop out.

Table 19—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by family structure characteristics

Variable	Change in % of population	Change in relative odds
Family composition		
Intact family	↓	reference
Two adults / step-parents	↑	=
Single parent	=	=
Other	↓	=
Parent education, highest level		
HS grad/GED or less	↓	↑
>HS completer	↑	reference
Own children living in Household		
Yes	↑	=
No	↓	reference

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table 20—Percentage distribution of 10th-grade dropouts within the cohorts of 1980 and 1990, by family structure variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Family composition		
Intact family	50.6	48.1
Two adults / step-parents	14.5	20.4*
Single parent	24.4	26.0
Other	10.5	5.6*
Parent education, highest level		
HS grad/GED or less	57.0	56.9
>HS grad/GED	43.0	43.1
Own children living in Household		
Yes	2.2	5.9*
No	97.8	94.2*

* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Decreases in the proportion of students parents with only a high school education was balanced by increases in the relative odds of dropping out for this group of students. This resulted in unchanged proportions of dropouts whose parents had only a high school diploma.

Family characteristics: Educational support

The summary of results in table 21 reiterate the findings from chapter 3 that students from families with different levels of support for education all shared in the general decline in dropout rates seen in the 1980s (i.e. the dropout rates decreased, but the relative risk of dropping out remained the same across groups). This fact, plus modest changes in the population characteristics of the 10th grade cohorts, resulted in few changes in the characteristics of dropouts in terms of these factors between 1980 and 1990.[46]

[46] One difference that did occur is the decline in the proportion of dropouts who "didn't know" their parents' highest level of education.

Table 21—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by educational support characteristics

Variable	Change in % of population	Change in relative odds
Mother's expectation		
Less than HS or HS grad	↓	=
Vocational school	↓	=
Some college	↑	=
Complete college	↑	reference
Graduate studies	↓	=
Don't know	↓	=
Specific place to study		
Yes	↓	reference
No	↑	=
Number of types of reading materials[1]		
None	=	reference
One	↑	=
Two	=	=

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

[1] Reading materials include two types of items: a newspaper and 50 or more books.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table 22—Percentage distribution of 10th-grade dropouts from the cohorts of 1980 and 1990, by educational support variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Mother's expectation		
Less than HS or HS grad	29.1	22.8
Vocational school	12.0	13.0
Some college	9.7	11.9
Complete college	13.2	24.2*
Graduate studies	11.6	15.7
Don't know	24.4	12.4*
Specific place to study		
Yes	42.0	38.1
No	58.0	61.9
Number of types of reading materials[1]		
None	9.8	8.7
One	33.7	36.5
Two	56.6	54.8

* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.
[1] Reading materials include two types of items: a newspaper and 50 or more books.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Multiple family at-risk factors

There were only marginal changes in the distribution of all students with family risk factors between 1980 and 1990, but there were changes in the relative risk of dropping out for students with multiple risk factors (table 23). The reader may recall from chapter 3 that *rates* declined between 1980 and 1990 for students with two or fewer risk factors, while rates for students with three or more family risk factors remained at the relatively high levels of 1980. Therefore those students who did drop out in 1990-92 generally had more risk factors that those dropping out in 1980-82 (table 24)—48 percent had three or more in 1990 (28.6 + 19.2) compared with 32 percent in 1980 (17.3 + 14.3).[47]

[47] The last two categories in table 24 were collapsed for this comparison and a separate standard error and t-test was conducted on these estimates.

Table 23—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by multiple family risk factors

Variable	Change in % of population	Change in relative odds
Multiple family risk factors[1]		
None	=	reference
One factor	↑	=
Two factors	=	=
Three factors	=	↑
Four factors	=	↑

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table 24—Percentage distribution of 10th-grade dropouts of 1980 and 1990, by multiple family risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Multiple family risk factors[1]		
No factors	14.3	9.9
One factor	32.0	18.6*
Two factors	22.2	23.7
Three factors	17.3	28.6*
Four or more factors	14.3	19.2

* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.

[1] Family risk factors include: lowest quartile of socioeconomic status; non-intact family composition; parent's education of high school graduate or less; having own child living at home; mother's expectation of less than high school or only high school graduate; not having a specific place to study; and having none of the types of reading materials at the home.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Academic Risk Factors

Educational Engagement

As was shown in earlier chapters, sophomores in 1990 were more engaged in schooling than were sophomores in 1980—at least as measured by the engagement variables used here. Students reported watching less television, doing more homework, and coming better prepared for class in 1990 (table 25). It was also shown that dropout rates for students disengaged from school decreased nearly as far as did rates for other, more involved students. This resulted in these engagement factors, while less prevalent in the population, remaining just as salient to dropout rates in 1990 than in 1980—the relative risk of dropping out for students not engaged in school remained relatively unchanged over the decade even as, overall students were becoming more engaged in schooling.

The sum of these two forces—changing population characteristics and stable relative risk profiles for those not engaged—resulted in a greater proportion of dropouts in 1992 as opposed to 1982 who were, while in school, somewhat more engaged in school (table 26).

Table 25—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by educational engagement factors

Variable	Change in % of population	Change in relative odds
Watch TV		
5 hours or less	↑	reference
More than 5 hours	↓	↑
Hours working per week		
20 or less	↓	reference
Over 20	↑	=
Homework per week		
None	=	=
>0-10 hours	↓	reference
More than 10 hours	↑	=
How often student attends class without books		
Often/some times	↓	=
Seldom/never	↑	reference
How often student attends class without pencil or paper		
Often/some times	↓	↑
Seldom/never	↑	reference

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table 26—Percentage distribution of dropouts from the 10th-grade cohorts of 1980 and 1990, by educational engagement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Watch TV		
5 hours or less	70.9	83.1*
More than 5 hours	29.1	16.9*
Hours working per week		
20 or less	68.4	66.1
Over 20	31.6	33.9
Homework per week		
None	20.6	19.3
>0-10 hours	76.0	76.0
More than 10 hours	3.5	4.7
How often student attends class without books		
Often/some times	17.5	12.1*
Seldom/never	82.5	87.9*
How often student attends class without pencil or paper		
Often/some times	25.9	14.2*
Seldom/never	74.1	85.8*

* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Academic Achievement

One of the most important trends in secondary education over the decade of the 1980's was the increase in the general achievement levels of high school students. As was shown in this report—which only confirmed the trend data from other sources—sophomores earned more credits, had better grades, and were less likely than their 1980 peers to take (and presumably need) remedial mathematics and remedial English classes (table 27). As was shown in chapter 2, students' mathematics achievement was also higher in 1990 than it was in 1980—scoring on average 4 points higher than in 1980 (table 6). The one exception to this general improvement in achievement is the proportion of sophomores who had been held back at least one grade in school. More 10th graders in 1990 had been held back compared with 10th graders in 1980.

However, the smaller proportion of students that did have relatively low achievement in 1990 were much more likely than their peers to drop out of school, compared with the 1980 cohort. The declines in dropout rates seen overall across the decade were greatest for students with adequate levels of achievement. Those with poor academic achievement dropped out at rates similar to the low achieving peers in 1980, making their dropout rates relative to their own cohort of students all the more striking. For example, in 1980 those whose mathematics achievement put them in the lowest decile for their class were about 3 times as likely in terms of odds to drop out—in 1990 those in the bottom decile were over 5 and a half times as likely to do so.

However, in general, the changes in the characteristics of 10th graders and changes in dropout rates for each cohort, resulted in 1990 dropouts being better prepared academically than were their peers in 1980 (tables 28 and 29). There were slightly fewer low achieving dropouts among the 1990 cohort (in terms of mathematics attainment), and dropouts in 1990–92 had earned a greater number of credits in the 10th grade overall, and had earned a greater number of academic credits by the end of the tenth grade and at the time that they had dropped out of school.

Table 27—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by educational engagement factors

Variable	Change in % of population	Change in relative odds
Low mathematics test score[1]		
Yes	NA	↑
No	NA	reference
Grades		
D and below	↓	↑
C	=	↑
B	↑	=
A	↑	reference
Credits earned		
Below 5	↓	=
5–10	↓	↑
10 +	↑	reference
Remedial English		
Yes	↓	↑
No	↑	reference
Remedial Math		
Yes	↓	↑
No	↑	reference
Ever repeat a grade		
Yes	↑	=
No	↓	reference

[1] Scoring in the lowest decile for their cohort.

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table 28—Percentage distribution of dropouts from the 10th-grade cohorts of 1980 and 1990, by prior academic achievement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Low mathematics test score[1]		
Yes	22.6	34.4*
No	77.4	65.6*
Low grades		
D and below	49.7	48.7
C	39.8	45.7
B	9.4	5.4*
A	1.1	0.3
Credits earned		
Below 5	19.1	14.5
5 to 10	48.1	42.4
10 +	32.7	43.1*
Remedial English		
Yes	43.5	39.5
No	56.5	60.5
Remedial Math		
Yes	49.1	45.1
No	51.0	54.9
Ever repeat a grade		
Yes	30.8	38.0
No	69.2	62.0

* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.
[1] Scoring in the lowest decile for their cohort.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table 29—Number of credits earned and test scores for dropouts from the sophomore classes of 1980 and 1990

	1980 cohort	1990 cohort
Total credits* earned by the end of the 12th grade	10.0	10.6
Academic credits earned by the end of the 12th grade	6.4	7.1*
Total credits in 10th grade	7.9	8.7*
Academic credits in 10th grade	5.2	6.0*
Mathematics test score (number correct out of 58)	24.4	25.0

*One credit represents 1 Carnegie unit.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Multiple academic factors

Given the results summarized above, it is not surprising then that students with multiple academic at risk factors also fell between 1980 and 1990 (table 30). Compared with the sophomore class of 1980, the 1990 cohort had proportionally fewer members with more than one academic risk factor and had proportionately more members displaying none of the risk factors. However, the impact on dropout rates of multiple risk factors increased over the decade—for example in 1980 those with five or more risk factors were 8 times more likely in terms of odds to drop out, while in 1990 those with 5 or more were 29 times more likely to drop out. Dropout rates decreased over the decade for only those with one or no academic risk factors, but remained fairly constant for those with more than one factor.

Therefore, the proportion of dropouts from the 1990 sophomore cohort was less likely to have no factors than were their peers in 1980 (table 31). About 19 percent of dropouts from the 1980 cohort had no academic risk factors compared with 13 percent of the 1990 cohort of dropouts.

Table 30—Change in percentage distribution of 10th-grade cohorts of 1980 and 1990 and change in relative odds of dropping out, by educational engagement factors

Variable	Change in % of population	Change in relative odds
Multiple academic factors[1]		
None	↑	reference
One	=	↑
Two	↓	↑
Three	↓	↑
Four	↓	↑
Five or more	↓	↑

[1] Academic factors include: watching more than 5 hours of TV per day; working more than 20 hours per week; doing no homework per week; often or sometimes attending class without books; often or sometimes attending class without paper or pencil; low math test scores; D and below average grades; below 5 credits earned by end of 10th grade; taken remedial math; taken remedial English; ever repeated a grade.

NOTE: ↑,↓, and = indicate that proportion increased, decreased, or remained constant respectively between 1980 and 1990, or that the odds ratio increased, decreased, or remained constant over these ten years compared to the indicated reference group.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table 31—Percentage distribution of dropouts from the 10th-grade cohorts of 1980 and 1990, by multiple academic risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	100.0	100.0
Multiple academic risk factors[1]		
No factors	19.2	12.5*
One factor	22.4	20.7
Two factors	21.5	26.1
Three factors	17.5	17.4
Four factors	10.1	13.2
Five factors	9.3	10.1

* indicates that the 1990 estimate is significantly different than the similar estimate in 1980.

[1] Academic factors include: watching more than 5 hours of TV per day; working more than 20 hours per week; doing no homework per week; often or sometimes attending class without books; often or sometimes attending class without paper or pencil; low math test scores; D and below average grades; below 5 credits earned by end of 10th grade; taken remedial math; taken remedial English; ever repeated a grade.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

APPENDIX A

TECHNICAL NOTES

APPENDIX A
METHODS

DATA

Data from the High School and Beyond (HS&B) Base Year Survey were used in this report to describe the status of the 1980 sophomore cohort in the spring of 1982. Data from the First Follow-up to HS&B were used to determine dropout status, while data from the HS&B transcript study were used to describe the course-taking patterns of the 1980 cohort.[56] The 1990 cohort was described using the First Follow-up to the National Education Longitudinal Study of 1988 (NELS:88), while data from the Second Follow-up to NELS:88 were used to describe dropout status of the 1990 cohort in the spring of 1992. Data from the NELS:88 high school transcript study were used to describe the course-taking patterns of the 1990 sophomore cohort.[57]

NELS:88 was designed to facilitate longitudinal comparisons with HS&B. Use of appropriate cohort membership flags permit the analyst to compare the characteristics and dropout rates of the sophomore cohort of 1980 and the sophomore cohort of 1990. While the studies were designed to be as comparable as possible, care should be given when making such contrasts. For example:

> Student response rates differed in the (two) surveys and the characteristics of the nonrespondents may also differ across surveys as well. Differences in context and question order for trend items in the...student questionnaires, and other factors such as differences in data collection methodology, may also influence the accuracy of intercohort comparisons.[58]

Overlap between the surveys can be viewed in terms of questionnaire, cognitive test, and transcripts data:

Questionnaire overlap. There were a number of questionnaire items that were repeated in identical form across surveys. However, there were also some items that shared content, but did not have identical wording. In a very few cases it was felt that

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[56]For more details on the HS&B surveys see: C. Jones et al. *High School and Beyond 1980 Sophomore Cohort First Follow-up (1982) Data User Manual*. National Center For Education Statistics, 1983; and C. Jones et al. *High School and Beyond Transcripts Survey (1982) Data User's Manual*. National Center for Education Statistics, 1983.

[57]For more details on the NELS:88 survey data see: S. Ingels et al. *National Education Longitudinal Study of 1988 First Follow-up: Student Component Data File User's Manual*. National Center for Education Statistics, 1992; S. Ingels et al. *National Education Longitudinal Study of 1988 Second Follow-up: Student Component Data File User's Manual*. National Center for Education Statistics, 1993; and S. Ingels et al. *National Education Longitudinal Study of 1988 Second Follow-up: Transcript Component Data File User's Manual*. National Center for Education Statistics, 1994

[58]S. Ingels et al. *National Education Longitudinal Study of 1988 Second Follow-up: Student Component Data File User's Manual*. National Center for Education Statistics, 1993.

these differences were so great as to negate the possibility of any comparisons. However, in most instances, a simple recoding of response categories allowed proper (or approximate comparisons across cohorts). The section on variables within this appendix details those instances where recoding took place.

Mathematics Test Battery. There were enough common items between the NELS:88 and HS&B mathematics tests to provide a basis for equating the two mathematics assessments. IRT methods were used to put the HS&B assessment on a common scale as the NELS:88 assessment.

Transcript Comparability. The NELS:88 and HS&B high school transcript studies were conducted specifically to allow comparisons across cohorts.

SAMPLES AND WEIGHTS USED IN ANALYSIS

The NELS:88 sample used was the 1990 sophomore spring cohort (G10COHRT=1) who were also members of the first follow-up—second follow-up panel (F2F1PNFL=1). (That is, they were participants in both the 1990 First Follow-up Survey and the 1992 Second Follow-up Survey.) This resulted in an overall sample size of 16,749 students. This sample of students included freshened sample members—those students added to the original sample to create a valid probability sample of students enrolled in the tenth grade in the 1989-90 school year.[59] The first follow-up—second follow-up panel weight was used for most of the analyses (F2F1PNWT). However, because the high school transcript survey sample was a subset of the full sample of students, analyses of the transcript data used the high school transcript weight (F2TRSCWT).

The HS&B sample used was the 1980 sophomore cohort who were respondents to the first follow-up survey (FU1PART=1). This resulted in an overall sample size of 14,102 students. The main body of analyses were weighted by the first follow-up weight (FU1WT). Due to the fact that, like the NELS:88 high school transcript survey, the HS&B high school transcript survey sample was a subset of the full sample of students, analyses which use the transcript data employ the high school transcript study weight (TRWT). In addition, in the process of equating the HS&B mathematics test data with the NELS:88 test data, a special weight was created by the Educational Testing Service. This weight was used for analyses of the HS&B mathematics test data (TESTWT).

METHODOLOGY

In this report, descriptive statistics were used to summarize differences in the populations of 10th graders in 1990 and 1980 and differences in dropout rates for these

[59]See S. Ingels et al. *National Education Longitudinal Study of 1988 Second Follow-up: Student Component Data File User's Manual*. National Center for Education Statistics, 1993 for more details.

two cohorts.[60] Student's t-test were used to test the statistical significance of any observed differences in population characteristics and dropout rates.

Logistic regression was then used to explore the relationships between the variables specified in the framework above and the probability of dropping out of school between the 10th and 12th grades. Because of the complex nature of the NELS:88 and the HS&B survey designs, the logistic procedure within the SUDAAN software program was used.[61] SUDAAN uses a Taylor series approximation technique to obtain logistic regression estimates and computes appropriate standard errors for those estimates taking into account the sample design of the survey.

Logistic regression was used to calculate the odds ratios for each comparison listed. For example, the odds ratio for dropping out between 1980 and 1982 comparing poor to non-poor students is 2.25.

This ratio can be calculated in the following manner:

1. The proportion of poor students dropping out = 0.145; odds = 0.145/(1-0.145)=0.1696. The proportion of non-poor students dropping out is 0.070; odds = 0.070/(1-0.070)=0.075.

2. The odds ratio of poor vs. non-poor students = 0.1696/0.075=2.25.

In simple terms this means that being poor rather than non-poor increases a student's odds of dropping out by a factor of 2.25—or, in other words, students living in poverty in 1980-82 were about 125 percent more likely to drop out than were other students.

One can also use logistic regression to calculate these odds ratios. The logistic model is generally written in terms of the odds in the following manner:

$$\log\left(\frac{\text{Prob(event)}}{\text{Prob(no event)}}\right) = B_0 + B_1X_1 + \ldots + B_pX_p$$

or alternatively:

$$\frac{\text{Prob(event)}}{\text{Prob(no event)}} = e^{B_0 + B_1X_1 + \ldots + B_pX_p}$$

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[60] Appendix A provides a full description of the creation of the variables in this analysis and the manner in which the coding of variables were equated in HS&B and NELS:88.

[61] Shah, B., Barnwell, B. Hunt, P. and LaVange, L., *SUDAAN Users Manual*. Research Triangle Institute, Release 6.0.

For example, using logistic regression one can regress dropping out (coded 1,0) on poverty status (coded 1,0). This model can be written as

$$\frac{\text{Prob(dropping out)}}{\text{Prob(not dropping out)}} = e^{B_0 + B\text{poverty}}$$

Fitting this model with SUDAAN, a logistic regression program that takes into account the complex sampling design of NELS:88, results in

Variable	B	S.E.	T-test	Sig.
Constant	-2.479	0.04	-56.86	<0.001
Poverty	0.812	0.07	9.52	<0.001

The odds ratio for the comparison of poor to non-poor for dropping out is calculated by

$$\hat{\psi} = e^{0.812} = 2.25,$$

or the same odds ratio calculated above. The significance of this odds ratio is identical to the significance of the t-test for the B coefficient upon which it is based.

VARIABLES

Dropout status

The original dropout status variable in HS&B was defined somewhat differently than in the status variable in NELS:88.[62] . The essential differences was the way in which the surveys handled alternative students. Specifically, HS&B originally considered those who were in "alternative" programs such as those leading to a GED, or those who had received a GED as dropouts, not students or completers respectively. NELS:88 was created so that researchers would have the flexibility to define dropping out in more than one way and we used this flexibility to consider these cohort members as students in this report. Among other reasons (including the fact that we think it is correct) this definition also corresponds to the definition of dropouts used in NCES's annual dropout report to Congress. Obviously, counting them as dropouts would change the dropout rates reported here. Nevertheless, in order to equate the two, several modifications were made to the original HS&B definition.

HS&B—If FUSTTYPE (first follow-up student type) was equal to 2 (dropout) and FD16 (plan to go back to high school to get diploma or GED) was not equal to 4 (have GED) and FD36AA (have participated in GED program since leaving high school) was not equal to 1 (yes) and they still were participating in the program (FD36F eq 3) then the sample member was considered a dropout. Otherwise the sample member was considered a student.

NELS:88—If F2DOSTAT (second follow-up dropout status) was equal to 5 (dropout, no return) a sample member was considered a dropout. Otherwise the sample member was considered a student.

Race-ethnicity

HS&B—Race-ethnicity was RACE2 (composite race) which was recoded to match the coding of the NELS:88 race variable.

NELS:88—Race was based on the second follow-up composite race variable (F2RACE).

Poverty

Students were considered to be living in families below the poverty line if their family income fell below the official federal poverty thresholds for a family of a certain size in 1980 and 1990. However, since the income variable was coded as categorical, there were

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[62]The NELS:88 Second Follow-up Dropout Data Users Manual has an extensive discussion of the differences in definitional use in the two surveys.

instances where the income categories did not match the exact poverty thresholds. In these instances, the nearest income category was used.

HS&B—Sample members were considered below poverty line:

If family size (FAMSIZE) is 1 to 3 and family income (BB101) is $7,000 or less or;
If family size is 4 to 6 and income is $11,999 or less or;
If family size is 7 or more and income is under $15,999

All other sample members were considered not below poverty line

NELS:88—Sample members were considered below poverty line:

If family size (BYFAMSIZE) is 1 or 2 and family income (BYFAMINC) is $7,499 or less or;
If family size is 3 and family income is $9,999 or less or;
If family size is 4 or 5 and family income is $14,999 or less or;
If family size is 6 or 7 and family income is $19,999 or less or;
If family size is 8 and family income is $24,999 or less or;
If family size is 9 or more and family income is $34,999 or less;

All other sample members were considered not below poverty line

Family composition

HS&B—The following coding scheme was used :

1. Intact:

If father in household (BB036B=1) and mother in HH (BB036D=1)

2. Parent plus step parent

If father not in HH (BB036B=0) and mother in HH (BB036D=1) and male guardian in HH (BB036C=1) or;
If mother not in HH (BB036D=0) and father in HH (BB036B=1) and female guardian in HH (BB036E=1)

3. Single parent

If father is in HH (BB036B=1) and no other adult partner is in HH (BB036D to BB036E =0) or;
If mother is in HH (BB036D=1) and not other adult partner is in HH (BB036B to BB036C =0)

4. Other

All other cases.

NELS:88—The following coding scheme was used :

1. Intact:

If father in household (F1S92A=1) and mother in HH (F1S92D=1)

2. Parent plus step parent

If father not in HH (F1S92A=0) and mother in HH (F1S92D=1) and male guardian or stepfather in HH (F1S92C=1 or F1S92B=1) or;
If mother not in HH (F1S92D=0) and father in HH (F1S92A=1) and female guardian or stepmother in HH (F1S92E=1 or F1S92F)

3. Single parent

If father is in HH (F1S92A=1) and no other adult partner is in HH (F1S92D to F1S92F =0) or;
If mother is in HH (F1S92C=1) and no other adult partner is in HH (F1S92A to F1S92C=0).

4. Other

All other cases.

Parent's highest education

HS&B—Parent's education was based on the composite variable PAREDUC.

NELS:88—Parent's education was based on the composite variable F1PARED.

Own children in home

HS&B—If BB036I (own child living in HH) was equal to 1.

NELS:88—If F1S92I (own child living in HH) was equal to 1.

Specific place to study

HS&B—If BB104A (possessions in the home—a specific place to study) was equal to 1.

NELS:88—If BYS35A (possessions in the home—a specific place to study) was equal to 1 or if F1N21A (possessions in the home—a specific place to study) was equal to 1.

Mother's expectations for student's further education

HS&B—Based on the variable BB066 (How far does your mother expect you to go in school)

NELS:88—Based on the variable F1S48B (How far does your mother expect you to go in school).

Along with a don't know category, F1S48B has a "mother doesn't care" response category that the HS&B item does not contain. However, for the purposes of this analysis we assumed that those students in NELS:88 who responded "mother doesn't care" would have showed up as "missing" on the HS&B item.

Homework per week

HS&B—Based on the responses to BB015 (Approximately what is the average amount of time that you spend on homework a week). If BB015 equaled 1 (none is assigned) or 2 (I don't do homework) then the student was coded as doing no homework. If BB015 ranged between 3 (less than 1 hour) and 6 (between 5 and 10 hours per week) then the student was coded as doing 0 to 10 hours per week. If BB015 equaled 7 (more than 10 hours a week) then the student was coded as doing more than 10 hours per week.

NELS:88—Based on the responses to F1S36A2 (Overall how much time do you spend on all homework *out of school*). If F1S36A2 equaled 0 (none) then the student was coded as doing no homework. If F1S36A2 ranged from 1 (1 hour or less) to 4 (7 to 9 hours) then the student was coded as doing 0 to 10 hours per week. If F1S36A2 ranged from 5 (10 to 12 hours) and 7 (over 15 hours) then the student was coded as doing more than 10 hours of homework per week.

As seen in the above definitions, there was some slippage between the coding of the homework variable between NELS:88 and HS&B. HS&B asked about homework in general, whereas the item we used here from NELS:88 asked about homework done outside of school (a separate item was used to ask about homework done inside of school). We made the assumption in this analysis that the vast majority of students in HS&B interpreted BB015 as referring to homework done outside of school. In any case, if this assumption was not valid then the differences in the amount of homework done by NELS:88 and HS&B should be even greater than shown here. There was also slippage in the cut points for this variable. Students in HS&B who did exactly 10 hours of homework would be classified in category 2 while students in NELS:88 who did exactly 10 hours of homework would be classified in category 3. We felt that these differences should have had a minimal impact on the estimates presented here.

Watch TV

HS&B—Based on BB048 (During week days, how many hours per day do you watch TV). If BB048 equaled 7 (5 or more hours) then the student was coded as 1. Otherwise the student was coded as 0.

NELS:88—Based on F1S45A (During the school year, how many hours a day do you usually watch TV on weekdays). If F1S45A equaled 6 (more than 5 hours) then the student was coded as 1. Otherwise the student was coded as 0.

As seen above, there was some slippage between the coding of this variable between the datasets. If a student in HS&B watched *exactly* 5 hours of TV during the week then they were coded as watching more than 5 hours of TV. In NELS:88, if a student watched *exactly* 5 hours of TV a week they were coded as watching less than 5 or less hours. However, it is unreasonable to think that all (or even most) of the differences shown in this analysis was due to this coding difference. For example, there far fewer students in NELS:88 who watched 4 or more hours of TV than watched 5 or more hours of TV in HS&B.

Hours worked per week

HS&B—Based on BB019 (Worked for pay last week) and BB022 (How many hours do/did you work on your current or most recent job). If BB015 ranged from 5 (22-29 hours) to 7 (35 hours or more) the student was coded as working more than 20 hours per week.

NELS:88—Based on F1S84 (Are your currently employed) and F1S85 (How many hours do/did you usually work on your current or most recent job). If F1S85 ranged from 3 (21-30 hours) and 5 (more than 40 hours) then the student was coded as working more than 20 hours per week.

Credits earned

NELS:88 and HS&B—Estimates of credits earned in various subject areas were based on high school transcript data classified by the Secondary School Taxonomy of courses (SST).

Grade Point Average

NELS:88 and HS&B—Estimates were based on GPAs from the student's high school transcripts.

Low mathematics score

HS&B and NELS:88—Based on a variable created by ETS that equated the HS&B mathematics test to the NELS:88 mathematics test. The variable was coded 1 if the sample member was in the lowest decile for their cohort on the mathematics test and 0 otherwise.

APPENDIX B

STANDARD ERROR TABLES

Table B1 Standard errors for Table 1—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by race–ethnicity and poverty status

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Race–ethnicity		
Asian, Pacific Islander	0.14	0.29
Hispanic	0.40	0.86
Black, non-Hispanic	0.84	0.79
White, non-Hispanic	1.07	1.18
Native American	0.23	0.20
Below poverty level		
Yes	0.51	0.69
No	0.51	0.69

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B2 Standard errors for Table 2—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by family structure variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Family composition		
Intact family	0.66	0.69
Two adults/step parents	0.34	0.51
Single parent	0.47	0.53
Other	0.26	0.23
Parent education, highest level		
HS grad/GED or less	0.76	0.78
Some college or more	0.76	0.78
Own children living in household		
Male		
Yes	0.11	0.19
No	0.11	0.19
Female		
Yes	0.16	0.25
No	0.16	0.25

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B3 Standard errors for Table 3—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by educational support variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Mother's expectation		
Less than HS or HS grad	0.43	0.42
Vocational school	0.40	0.35
Some college	0.41	0.43
Complete college	0.67	0.64
Graduate studies	0.57	0.58
Don't know	0.52	0.29
Specific place to study		
Yes	0.66	0.69
No	0.66	0.69
Number of types of reading materials[1]		
Zero	0.28	0.33
One	0.59	0.66
Two	0.66	0.74

[1] Includes two types of items: a newspaper and 50 or more books.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B4 Standard errors for Table 4—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by multiple family risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Multiple risk factors		
None	0.62	0.54
One	0.59	0.68
Two	0.50	0.52
Three	0.41	0.48
Four or more	0.34	0.39

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table B5 Standard errors for Table 5—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by educational engagement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Watch TV per day		
5 hours or less	0.59	0.45
More than 5 hours	0.59	0.45
Hours of work per week		
20 or less	0.54	0.60
More than 20	0.54	0.60
Homework per week		
None	0.33	0.40
More than 0 to 10	0.46	0.58
More than 10 hours	0.40	0.47
How often student attends class without books		
Often/sometimes	0.36	0.31
Seldom/never	0.36	0.31
How often student attends class without pencil or paper		
Often/sometimes	0.46	0.38
Seldom/Never	0.46	0.38

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B6 Standard errors for Table 6—Number of credits earned and test scores for the sophomore classes of 1980 and 1990

	1980 cohort	1990 cohort
Total credits* earned	0.12	0.12
Academic credits earned	0.10	0.10
Total credits in 10th grade	0.07	0.06
Academic credits in 10th grade	0.06	0.05
Mathematics test score (number correct out of 40)	0.23	0.22

*One credit represents 1 Carnegie unit.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table B7 Standard errors for Table 7—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by prior academic achievement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Low mathematics test score[1]		
Yes	0.42	0.43
No	0.42	0.43
Low grades		
D and below	0.66	0.48
C	0.61	0.65
B	0.73	0.63
A	0.38	0.43
Credits earned		
Below 5	0.37	0.22
5 to 10	0.90	0.62
10 +	1.01	0.68
Remedial English		
Yes	0.74	0.61
No	0.74	0.61
Remedial Math		
Yes	0.63	0.59
No	0.63	0.59
Ever repeat a grade		
Yes	0.42	0.56
No	0.42	0.56

[1] Scoring in the lowest decile for their cohort.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B8 Standard errors for Table 8—Percentage distribution of 10th-grade cohorts of 1980 and 1990, by multiple academic risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Multiple risk factors		
None	0.67	0.69
One	0.49	0.48
Two	0.46	0.53
Three	0.36	0.32
Four	0.28	0.32
Five or more	0.18	0.18

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B9 Standard errors for Table 9—Tenth to twelfth grade dropout rates by gender: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Gender				
Male	0.69	—	0.44	—
Female	0.60	—	0.65	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B10 Standard errors for Table 10—Dropout rates, by race–ethnicity and poverty status: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Race–ethnicity				
Asian, Pacific Islander	0.72	—	1.54	—
Hispanic	1.83	—	1.44	—
Black, non-Hispanic	1.15	—	1.13	—
White, non-Hispanic	0.51	—	0.42	—
Native American	5.23	—	6.88	—
Below poverty level				
Yes	0.90	—	1.63	—
No	0.32	—	0.33	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B11 Standard errors for Table 11—Dropout rates, by family structure variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Family composition				
Intact family	0.29	—	0.49	—
Two adults/step parents	1.14	—	1.00	—
Single parent	0.72	—	0.92	—
Other	1.90	—	2.06	—
Parent education, highest level				
HS grad/GED or less	0.78	—	1.03	—
>HS grad/GED	0.45	—	0.29	—
Own children living in household				
Male				
Yes	6.25	—	2.36	—
No	0.40	—	0.44	—
Female				
Yes	7.74	—	3.68	—
No	0.39	—	0.65	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B12 Standard errors for Table 12—Dropout rates, by educational variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Mother's expectation				
Less than HS or HS grad	1.16	—	3.98	—
Vocational school	0.93	—	1.13	—
Some college	0.75	—	0.53	—
Complete college	0.43	—	0.30	—
Graduate studies	0.45	—	1.02	—
Don't know	0.67	—	1.53	—
Specific place to study				
Yes	0.35	—	0.53	—
No	0.43	—	0.55	—
Number of reading materials at home				
None	1.24	—	1.73	—
One	0.53	—	0.70	—
Two	0.28	—	0.47	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B13 Standard errors for Table 13—Tenth to twelfth grade dropout rates, by multiple at-risk factors: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Multiple factors				
None	0.62	—	0.54	—
One	0.59	—	0.68	—
Two	0.50	—	0.52	—
Three	0.41	—	0.48	—
Four or more	0.34	—	0.39	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B14 Standard errors for Table 14—Dropout rates, by educational engagement variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Watch TV per day				
5 hours or less	0.32	—	0.37	—
More than 5 hours	0.58	—	1.90	—
Hours of work per week				
20 or less	0.31	—	0.43	—
More than 20	0.77	—	0.91	—
Homework per week				
None	1.90	—	2.15	—
>0–10	0.29	—	0.36	—
More than 10 hours	1.08	—	0.48	—
How often student attends class without paper/pencil				
Often	1.51	—	1.79	—
Sometimes	1.15	—	1.00	—
Seldom	0.40	—	0.70	—
Never	0.41	—	0.45	—
How often student attends class without books				
Often	1.78	—	2.60	—
Sometimes	2.22	—	1.67	—
Seldom	0.45	—	0.53	—
Never	0.35	—	0.56	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B15 Standard errors for Table 15—Dropout rates, by prior academic achievement variables: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Low mathematics test score[1]				
Yes	1.23	—	1.87	—
No	0.27	—	0.29	—
Grades				
D and below	1.90	—	1.93	—
C	0.67	—	0.71	—
B	0.40	—	0.16	—
A	0.51	—	0.08	—
Credits earned				
Below 5	4.23	—	6.18	—
5 to 10	1.19	—	1.92	—
10 +	0.36	—	0.27	—
Remedial English				
Yes	0.54	—	1.45	—
No	0.33	—	0.31	—
Remedial Math				
Yes	0.56	—	1.39	—
No	0.31	—	0.31	—
Ever repeat a grade				
Yes	1.70	—	1.34	—
No	0.44	—	0.34	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B16 Standard errors for Table 16—Tenth to twelfth grade dropout rates, by multiple at-risk factors: 1980–82 and 1990–92

Status in 10th grade	1980 cohort		1990 cohort	
	Dropout rate	Odds ratio	Dropout rate	Odds ratio
Total	0.46	—	0.40	—
Multiple factors				
None	0.76	—	0.21	—
One	0.91	—	0.59	—
Two	0.91	—	1.67	—
Three	1.19	—	1.47	—
Four	1.46	—	3.04	—
Five or more	2.33	—	5.03	—

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First and Second Follow-up Surveys, 1990 and 1992.

Table B17 Standard errors for Table 18—Percentage distribution of 10th-grade dropouts within the cohorts of 1980 and 1990, by race–ethnicity and poverty status

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Race-ethnicity		
Asian, Pacific Islander	0.09	1.02
Hispanic	1.47	2.85
Black, non-Hispanic	1.68	2.24
White, non-Hispanic	2.34	3.36
American Indian, Alaskan	0.97	1.55
Below poverty level		
Yes	1.46	4.02
No	1.46	4.02

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table B18 Standard errors for Table 20—Percentage distribution of 10th-grade dropouts within the cohorts of 1980 and 1990, by family structure variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Family composition		
Intact family	1.51	3.24
Two adults / step-parents	1.08	2.45
Single parent	1.23	2.58
Other	0.94	1.07
Parent education, highest level		
HS grad/GED or less	2.32	3.19
>HS grad/GED	2.32	3.19
Own children living in Household		
Yes	0.47	1.12
No	0.47	1.12

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table B19 Standard errors for Table 22—Percentage distribution of 10th-grade dropouts from the cohorts of 1980 and 1990, by educational support variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Mother's expectation		
Less than HS or HS grad	1.50	3.81
Vocational school	1.07	1.51
Some college	0.96	1.44
Complete college	1.24	2.42
Graduate studies	1.08	3.31
Don't know	1.44	1.92
Specific place to study		
Yes	1.53	3.46
No	1.53	3.46
Number of types of reading materials[1]		
None	0.91	1.43
One	1.75	2.99
Two	1.88	3.26

[1] Reading materials include two types of items: a newspaper and 50 or more books.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table B20 Standard errors for Table 24—Percentage distribution of 10th-grade dropouts of 1980 and 1990, by multiple family risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Multiple family risk factors[1]		
No factors	1.89	2.05
One factor	2.17	1.95
Two factors	1.31	2.52
Three factors	1.07	2.87
Four or more factors	1.05	3.05

[1] Family risk factors include: lowest quartile of socioeconomic status; non-intact family composition; parent's education of high school graduate or less; having own child living at home; mother's expectation of less than high school or only high school graduate; not having a specific place to study; and having none of the types of reading materials at the home.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Survey, 1990.

Table B21 Standard errors for Table 26—Percentage distribution of dropouts from the 10th-grade cohorts of 1980 and 1990, by educational engagement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Watch TV		
5 hours or less	1.45	3.00
More than 5 hours	1.45	3.00
Hours working per week		
20 or less	1.51	3.06
Over 20	1.51	3.06
Homework per week		
None	1.51	2.61
>0-10 hours	1.64	2.72
More than 10 hours	0.80	1.14
How often student attends class without books		
Often/some times	1.35	1.61
Seldom/never	1.35	1.61
How often student attends class without pencil or paper		
Often/some times	1.50	1.55
Seldom/never	1.50	1.55

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B22 Standard errors for Table 28—Percentage distribution of dropouts from the 10th-grade cohorts of 1980 and 1990, by prior academic achievement variables

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Low mathematics test score[1]		
Yes	1.41	3.08
No	1.41	3.08
Low grades		
D and below	2.50	3.39
C	2.25	3.42
B	1.42	1.08
A	0.52	0.18
Credits earned		
Below 5	2.05	2.65
5 to 10	2.41	3.08
10 +	2.14	3.21
Remedial English		
Yes	1.57	3.56
No	1.57	3.56
Remedial Math		
Yes	1.65	3.47
No	1.65	3.47
Ever repeat a grade		
Yes	1.79	3.25
No	1.79	3.25

[1] Scoring in the lowest decile for their cohort.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond study, Sophomore Cohort, Base Year Survey, 1980; U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988—First Follow-up Surveys, 1990.

Table B23 Standard errors for Table 31—Percentage distribution of dropouts from the 10th-grade cohorts of 1980 and 1990, by multiple academic risk factors

Status in 10th grade	1980 cohort	1990 cohort
Total	—	—
Multiple academic risk factors[1]		
No factors	2.00	1.54
One factor	1.68	2.28
Two factors	1.55	3.52
Three factors	1.35	1.89
Four factors	0.81	1.88
Five factors	0.71	2.03

[1] Academic factors include: watching more than 5 hours of TV per day; working more than 20 hours per week; doing no homework per week; often or sometimes attending class without books; often or sometimes attending class without paper or pencil; low math test scores; D and below average grades; below 5 credits earned by end of 10th grade; taken remedial math; taken remedial English; ever repeated a grade.

APPENDIX C

MULTIVARIATE ANALYSIS

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MULTIVARIATE ANALYSIS

This appendix summarizes a multivariate analysis of the data presented in this report. In contrast to the descriptive data presented in the body of this report, this section examines the "effect" of various at-risk factors, controlling or holding constant other factors. Logistic regression was used to explore the relationships between the variables specified in the framework shown in figure 1 in chapter 1 above and the probability of dropping out of school between the 10th and 12th grades. Because of the complex nature of the NELS:88 and the HS&B survey designs, the logistic procedure within the SUDAAN software program was used.[63] SUDAAN uses a Taylor series approximation technique to obtain logistic regression estimates and computes appropriate standard errors for those estimates taking into account the sample design of the survey.

The same models were estimated for both HS&B and NELS:88. In a hierarchical manner demographic characteristics were entered (set I), then in order: family structure characteristics (set II), family process characteristics (set III), academic engagement characteristics (set IV), and finally academic background characteristics (set V). Variables within sets were entered simultaneously. All of the previous variables were retained before entering the variables in the next set. All of the results of the multivariate models are presented as adjusted odds ratios. One variable that is missing in the framework in figure 1 is gender. Although dropout *rates* did not vary substantially by gender in either the 1980 or 1990 cohort, prior research has shown that the *process* of dropping out may vary by gender and the effect of the at-risk factors in figure 1 above may be different for males and females. Therefore, rather than add a gender interaction term for each at-risk factor, separate models for males and females were run and then examined whether there were any differences in the log odds for each variable. However, instead of presenting models separately for males and females, models were presented for the total sample only and have noted in the text where gender differences occurred.

Results

It is well known that race–ethnicity and socioeconomic status are highly related and that students from minority backgrounds are also more likely to have low SES. Therefore, the increased likelihood shown above of minority students being at risk may be due in part to their poverty status and not their race–ethnicity per se. In fact most of the variables presented in the framework in figure 1 above are correlated with one another to one degree or another.[64] For example, students from single-parent families are more likely to be from poor families than students from intact families. Any simple or univariate

[63]Shah, B., Barnwell, B., Hunt, P., and LaVange, L. *SUDAAN Users Manual*. Research Triangle Institute, Release 6.0.

[64]A correlation matrix is provided in appendix A.

relationship between school outcomes and being from a single-parent family may be due in part to the students' poverty status rather than having a single parent per se. Therefore, this appendix examines in a multivariate framework the relationships between the variables outlined in figure 1.

The multivariate tables below discusses two types of comparisons—1) within cohort effects of various "at-risk" factors and 2) differences between cohorts in these effects. Tables C1, and C2, display the results of the analysis of the C3 sets of variables expressed in terms of relative log odds ratios. These log odds ratios are expressed as the odds of a particular group dropping out as compared with the reference group. The reference group for each variable is indicated in the table by the note "ref=reference group." Table C3 displays a representation of the significance of the differences in these effects between 1980 and 1990.

Demographic characteristics: Poverty and Race-ethnicity

Poverty—The data presented in chapter 1 indicated that the proportion of kids living in poverty increased over the last decade. Table C1 also indicates that the relative odds of dropping out for students living below poverty line also increased. That is, there were more students living in poverty in 1990 than in 1980 and the effect of poverty on dropping out was greater in 1990. After controlling for race-ethnic differences, 10th grader living in poverty in 1980 was 2 and a quarter times as likely in terms of odds to drop out than were students from non-poor families. In 1990, the odds were almost 3 and a quarter times as high.

Race-ethnicity—After controlling for poverty status, the effect of race-ethnicity on dropping out was fairly constant for the two cohorts. That is, by in large all students regardless of race-ethnicity seem to have shared in the decline in dropout rates. The exception were Asian students whose odds of dropping out relative to white, non-Hispanic students increased between 1980 and 1990. Although in 1980 they were 85 percent less likely than white, non-Hispanic students to drop out, in 1990 their odds were not significantly different from white students.

Table C1—Estimated effect of independent variables on change in odds ratios for dropping out between 10th and 12th grades: 1980-82

	Model 1	Model 2	Model 3	Model 4	Model 5
Below poverty level (ref=no)					
Yes	2.10**	1.42**	1.45**	1.16	0.96
Race-ethnicity (ref=white, non-Hispanic)					
Asian, Pacific Islander	0.15**	0.14**	0.15**	0.16*	0.15**
Hispanic	1.70**	1.26	1.26	1.25	0.90
Black, non-Hispanic	1.13	0.83	0.87	0.90	0.59**
American Indian, Alaskan	2.66**	1.92*	1.82	1.68	1.73
Family composition (ref=intact)					
Two adults / step-parents		2.41**	2.46**	2.39**	2.36**
Single parent		1.86**	1.88**	1.79**	1.68**
Other		3.16**	2.75**	2.61**	1.97**
Parent education, highest level (ref=> HS)					
HS grad/GED or less		1.80**	1.49**	1.49**	1.39**
Own children living in HH (ref=no)					
Yes		3.42**	2.97**	2.72**	1.90*
Mother's expectation (ref=completecollege)					
Less than HS or HS grad			3.90**	3.42**	2.51**
Vocational school			2.16**	1.95**	1.54*
Some college			1.55**	1.55**	1.40*
Graduate studies			1.12	1.11	1.14
Don't know			1.88**	1.80**	1.55**
Specific place to study (ref=yes)					
No			0.93	0.92	0.97
Discuss program with parents (ref=always)					
Never			1.68**	1.40**	1.25
Sometimes			1.15	1.11	1.05
Watch TV (ref=5 hours or less)					
more than 5 hours				0.95	0.94
Hours working per week (ref=20 or less)					
over 20				1.75**	1.52**
Homework per week (ref=0 to 10)					
None				2.56**	1.86**
More than 10 hours				0.84	0.98
Low mathematics test score (ref=no)					
Yes					1.31*
Low grades (ref=D and above)					
Below D					3.06**
Credits earned (ref=10+)					
Below 5					6.30**
5 to 10					2.89**
Ever repeat a grade (ref=no)					
Yes					2.77**
Remedial Math (ref=no)					
Yes					1.39**
Remedial English (ref=no)					
Yes					0.89
-2 Log Likelihood	4721.96	4455.04	4327.58	4244.00	3679.58
Improvement in LL (%)	—	5.65%	2.86%	1.93%	13.30%

NOTE: * =significant at the 0.05;level; ** =significant at the 0.01 level

SOURCES: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Study, Sophomore cohort, First Follow-up Survey, 1982, unpublished data. U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988–First and Second Follow-up Surveys, 1990 and 1992, unpublished data.

Table C2—Estimated effect of independent variables on change in odds ratios for dropping out between 10th and 12th grades: 1990-92

	Model 1	Model 2	Model 3	Model 4	Model 5
Below poverty level (ref=no)					
Yes	3.22**	2.23**	2.01**	1.92**	1.67**
Race-ethnicity (ref=white, non-Hispanic)					
Asian, Pacific Islander	0.75	0.82	0.80	0.89	1.11
Hispanic	1.97**	1.65*	1.67**	1.67**	1.39*
Black, non-Hispanic	1.16	0.97	0.98	0.93	0.79
American Indian, Alaskan	2.92*	2.92*	2.41*	2.44*	2.56*
Family composition (ref=intact)					
Two adults / step-parents		1.72**	1.63*	1.58*	1.43*
Single parent		1.57**	1.46*	1.39*	1.30
Other		1.82**	1.63	1.58	1.55
Parent education, highest level (ref=>HS grad/GED)					
HS grad/GED or less		2.56**	1.99**	2.10**	1.70**
Own children living in HH (ref=no)					
Yes		2.36**	2.10**	2.05**	2.20**
Mother's expectation (ref=complete college)					
Less than HS or HS grad			5.93**	4.90**	3.00**
Vocational school			2.53**	2.23**	1.62*
Some college			1.23	1.22	0.98
Graduate studies			1.43	1.38	1.17
Don't know			2.80**	2.44**	1.77*
Specific place to study (ref=yes)					
No			1.00	0.97	1.06
Discuss program with parents (ref=always)					
Never			1.30	1.05	0.93
Sometimes			1.03	0.97	0.96
Watch TV (ref=5 hours or less)					
more than 5 hours				1.35	1.17
Hours working per week (ref=20 or less)					
over 20				1.60**	1.32
Homework per week (ref=0 to 10)					
None				1.88**	1.45
More than 10 hours				0.54	0.68
Low mathematics test score (ref=no)					
Yes					1.84**
Low grades (ref=D and above)					
Below D					1.92*
Credits earned (ref=10+)					
Below 5					9.12**
5 to 10					4.26**
Ever repeat a grade (ref=no)					
Yes					1.93**
Remedial Math (ref=no)					
Yes					1.58*
Remedial English (ref=no)					
Yes					1.31
-2 Log Likelihood	3669.11	3506.05	3315.72	3280.71	2816.59
Improvement in LL (%)	—	4.44%	5.43%	1.06%	14.15%

NOTE: * =significant at the 0.05;level; ** =significant at the 0.01 level

SOURCES: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Study, Sophomore cohort, First Follow-up Survey, 1982, unpublished data. U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988–First and Second Follow-up Surveys, 1990 and 1992, unpublished data.

Table C3—Differences in estimated effects of independent variables on change in odds ratios for dropping out between 10th and 12th grades: 1990-92 and 1980-82

	Model 1	Model 2	Model 3	Model 4	Model 5
Below poverty level (ref=no)					
Yes	*	*	*	**	**
Race-ethnicity (ref=white, non-Hispanic					
Asian, Pacific Islander	**	**	**	**	**
Hispanic					
Black, non-Hispanic					
American Indian, Alaskan					
Family composition (ref=intact)					
Two adults / step-parents				*	*
Single parent					
Other		**			
Parent education, highest level (ref=> HS)					
HS grad/GED or less		**			
Own children living in HH (ref=no)					
Yes					
Mother's expectation (ref=completecollege)					
Less than HS or HS grad					
Vocational school					
Some college					
Graduate studies					
Don't know					
Specific place to study (ref=yes)					
No					
Discuss program with parents (ref=always)					
Never					
Sometimes					
Watch TV (ref=5 hours or less)					
more than 5 hours					
Hours working per week (ref=20 or more)					
over 20					
Homework per week (ref=0 to 10)					
None					
More than 10 hours					
Low mathematics test score (ref=no)					
Yes					
Low grades (ref=D and above)					
Below D					
Credits earned (ref=10+)					
Below 5					
5 to 10					*
Ever repeat a grade (ref=no)					
Yes					
Remedial Math (ref=no)					
Yes					
Remedial English (ref=no)					
Yes					*

NOTE: * =significant at the 0.05 level; ** =significant at the 0.01 level

SOURCES: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Study, Sophomore cohort, First Follow-up Survey, 1982, unpublished data. U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988–First and Second Follow-up Surveys, 1990 and 1992, unpublished data.

Family /individual characteristics: structure

Family composition—In both cohorts, students from intact families in 10th grade were less likely to drop out than were students in other types of families, even after controlling for family poverty status and race-ethnicity. However, while this relationship remained statistically unchanged throughout the decade the odds ratios presented here suggest that the impact of living in a single parent family or a non-intact two parent family may have lessened. The relative odds in 1980 was 1.86 for students in single parent families compared to 1.57 in 1990.

Parental education—In both cohorts of sophomores, students whose parents' highest education was only high school completion were also more likely to drop out after controlling for poverty status and race-ethnicity. However, unlike with poverty status above, there were fewer students proportionately in 1990 than in 1980 with poorly educated parents. Perhaps in part because of this fact, the effect of low parental education on dropping out was greater in 1990 then in 1980. Relative to other students the odds of a student with poorly educated parents in 1980 dropping out was 80 percent greater--in 1990 it was 156 percent greater.

Own child living in household—Tenth graders who had their own child living at home with them were much more likely to drop out of school than were other students. This was true in both 1980 and 1990. However, as seen in table 1 above, a substantially larger (although still relatively small) proportion of students in 1990 had a child at home. While the estimated odds ratio's in tables C1 and C2 for each cohort seem to suggest that the relative disadvantage of dropping out for students with children at home was somewhat less in 1990 than in 1980, this difference is not statistically significant. Obviously, in many cases the weight of child care falls more heavily on the teenage mother than the teenage father. This is reflected in the proportion of females in both cohorts having their own child at home noted above. However, while fewer males had children at home, the effect of having a child of their own at home did not vary by gender. Nevertheless, despite the fact that official attendance policies concerning teenage childbearing have changed dramatically over the last decade (Title IX prevents districts from expelling students with children) the added burden of caring for a child of their own can make attending school almost impossible for some teenagers.[65]

Family characteristics: educational support

Having a specific place to study in their home did not seem to effect dropout rates in 1980 or 1990. However, frequency of conversations about their high school program did have an effect on dropout rates in 1980. Other factors in the model being constant, students who reported never discussing their high school program with their parents were 68 percent more likely to drop out than were students who always talked to their parents.

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[65]Gary Wehlage, R. Rutter, G. Smith, N. Lesko & R. Fernandez. *Reducing the Risk: Schools as Communities of Support*. The Falmer Press, 1989.

Frequency of conversations about high school programs did not have a significant effect on dropout rates in 1990.

Mother's expectations—Even after controlling for the variables in models I and II above, the expectations that students say their mother holds for them had a powerful effect on their propensity to drop out of school. These effects did not seem to change over the last decade either. In both cohorts, students who said their mother expected, at best, for them to finish only high school were 4 to 6 times more likely in terms of odds to drop out than students whose mothers expected them to finish college. Perhaps more interestingly, students in both cohorts of sophomores who reported they did not know that their mother expected of them were 2 to 3 times more likely than students whose mothers expected them to finish some college.

Academic background: Educational engagement

After taking into account variables in the prior models, the effect of the two of the school engagement variables used here were statistically significant for the 1990 cohort. Students who worked over 20 hours or who did no homework were significantly more likely to drop out than other students in both 1980-82 and 1990-92. However, this relationship between these factors and dropping did not change over the decade.

Academic background : Prior performance

Low mathematics score—Poor academic achievement has long been recognized as an early indicator of a students disengagement from school and increases the likelihood that the student will eventually drop out. While, table 2 above indicated that the sophomore class of 1990 generally demonstrated higher levels of mathematics achievement than did the class of 1980, tables 5 and 6 below shows that poor academic achievement in 10th grade was associated with dropping out of school for both cohorts. Students in both the 1980 and 1990 sophomore classes who scored in the lowest decile of mathematics achievement for their cohort were more likely to dropout than their higher achieving peers. However, this relationship was somewhat stronger in 1990 than in 1980. In 1980, students in the lowest decile were about 36 percent more likely in terms of odds, to drop out of school between the 10th and 12th grades--in 1990 similar students were over 2 times as likely.

Low grades, low credits, repeat grade, remedial math--Students in both cohorts were more likely to drop out if they, as of the 10th grade, had grade point averages were behind in their credits, had repeated a grade, or had taken remedial mathematics. Students in the 1990 cohort, but not the 1980 cohort, who had taken remedial English also dropped out at higher rates than other students.

While having an impact on dropout rates in both cohorts, the effect of being behind in credits changed over the decade. For both cohorts, being far behind (earning less than 5 credits by 10th grade) had approximately the same effect on the propensity for students to

drop out (or at least any changes were not statistically significant). However, the relative odds of dropping out for students who were less behind in their credits (those who had earned 5 to 10 credits), increased over the decade. In 1980, the odds of dropping out was about three times as high for students with 5 to 10 credits relative to those with over 10 credits. In 1990, the odds for similar students was 4 and a half times as high. Table C1 presents the results of the analysis for the 1980 sophomore cohort while table C2 presents the results for the 1990 cohort. Table C3 presents the results of a comparison of odds ratios between the 1980 and 1990 cohorts, with indication of those factors that were significantly different from year to year.

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